Government Emergency Telecommunications Service (GETS)

Exercise Analysis Report

DEMO '94

February 28, 1995

Prepared Under Contract Number
DCA 100-94-C-0054
(CDRL E015)

Science Applications International Corporation (SAIC)
1710 Goodridge Drive
McLean, Virginia 22102

-AQ #M97-09-5488

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SECTION 1

INTRODUCTION

The first integrated operational demonstration of the Government Emergency Telecommunications Service (GETS) Limited Capability (LC) features, dubbed Demo '94, was conducted on 25-27 October 1994 at the GTE Chantilly, Virginia, facility. The audience witnessed a live demonstration of GETS' ability to provide telecommunications support for National Security and Emergency Preparedness (NS/EP) user missions in a crisis environment. Demo '94 also showcased the integration of other National Communications System (NCS) initiatives and leading edge telecommunications technologies.

1.1 PURPOSE

This report documents GETS Demo '94 activities and presentations. It also details accomplishments and lessons learned that will aid in future demonstrations.

1.2 BACKGROUND

The NCS, comprised of 23 Federal Government organizations, is assigned, via Executive Order 12472, to provide reliable telecommunications for NS/EP users. As public telecommunications technology evolves, the Federal Government develops innovative and effective initiatives that capitalize on these new technologies to support NS/EP requirements. GETS is one such initiative.

GETS provides national and international voice and voice band data telecommunications to authorized NS/EP users during a wide range of emergency situations. Network controls, congestion, and physical damage often prevent call completion during an emergency. Not only is GETS providing a nationwide capability for enhanced routing and congestion avoidance over the Public Switched Network (PSN), but is also accessible from government networks, e.g., Federal Telecommunications Service 2000 (FTS2000) and the Diplomatic Telecommunications Service (DTS). GETS responds to outages due to emergency, disaster or war. Also, through ubiquitous access, ease of use and the ability to respond to technological advancements, GETS provides a long-term solution for NS/EP telecommunications.

Demo '94 included both present and future NS/EP telecommunications capabilities. The current technical capabilities of GETS were showcased, along with several other National Level NS/EP Telecommunications Program (NLP) initiatives that have proven to be valuable in real-world emergency situations. In addition, future services and capabilities that will fulfill the NS/EP requirements on the evolving PSN were exposed.

SECTION 2

THE DEMONSTRATION

Demo '94 consisted of one full day of demonstration, exhibition and lectures. At the main demonstration site in Chantilly, VA, Federal and industrial representatives witnessed video presentations, briefings and live demonstrations of the disaster scenario. The scenario involved a major earthquake along the New Madrid Fault in Missouri. The emergency response services were experiencing difficulty coordinating efforts due to phone outages. The Jefferson Barracks site near St. Louis, MO provided a combination of military tactical and commercial equipment and services. The demonstration was repeated on each of three days, to allow the maximum number of spectators to attend the event.

2.1 THE SCENARIO

In order to demonstrate GETS coherently, a simulation involving emergencies requiring telecommunications assistance and recovery was established. This scenario included events likely to occur during large and significant disasters that would hamper or block the PSN. In addition, these events provided for activity in response to security threats, network congestion, and natural disaster. The events in the postulated scenario are also representative of disasters and disruptions experienced between February 1993 and February 1994 (see Figure 2.1). During this time period, the US experienced a significant terrorist attack on the World Trade Center in New York City, disastrous flooding in the Midwest, disabling fires and the Northridge Earthquake in the Los Angeles area, and serious breaches in the security of the Internet. While none of these events proved overwhelming to the telecommunications system, several in close formation could seriously impact the ability of telecommunications providers to continue service seamlessly.

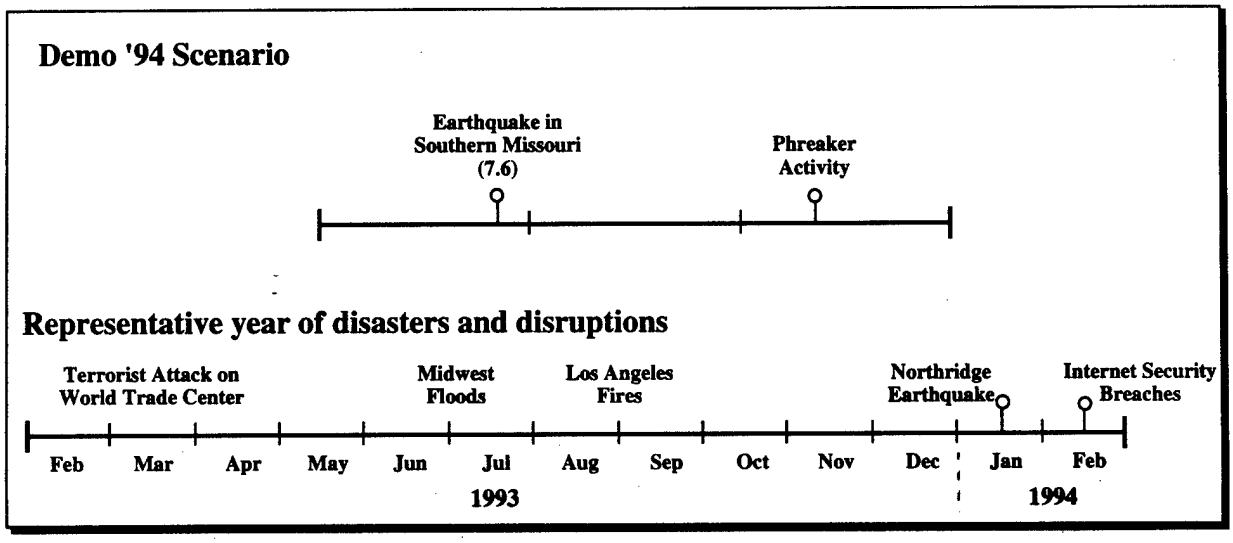

Figure 2.1. Demo '94 Scenario Overview

In the demonstration scenario, a significant earthquake occurs along the New Madrid fault in southern Missouri measuring 7.6 on the Richter scale as shown in Figure 2.2. An earthquake of greater scale occurred in the New Madrid area in 1811-12. The President declares a Major Disaster for the affected region. The Federal Emergency Response Plan is activated.

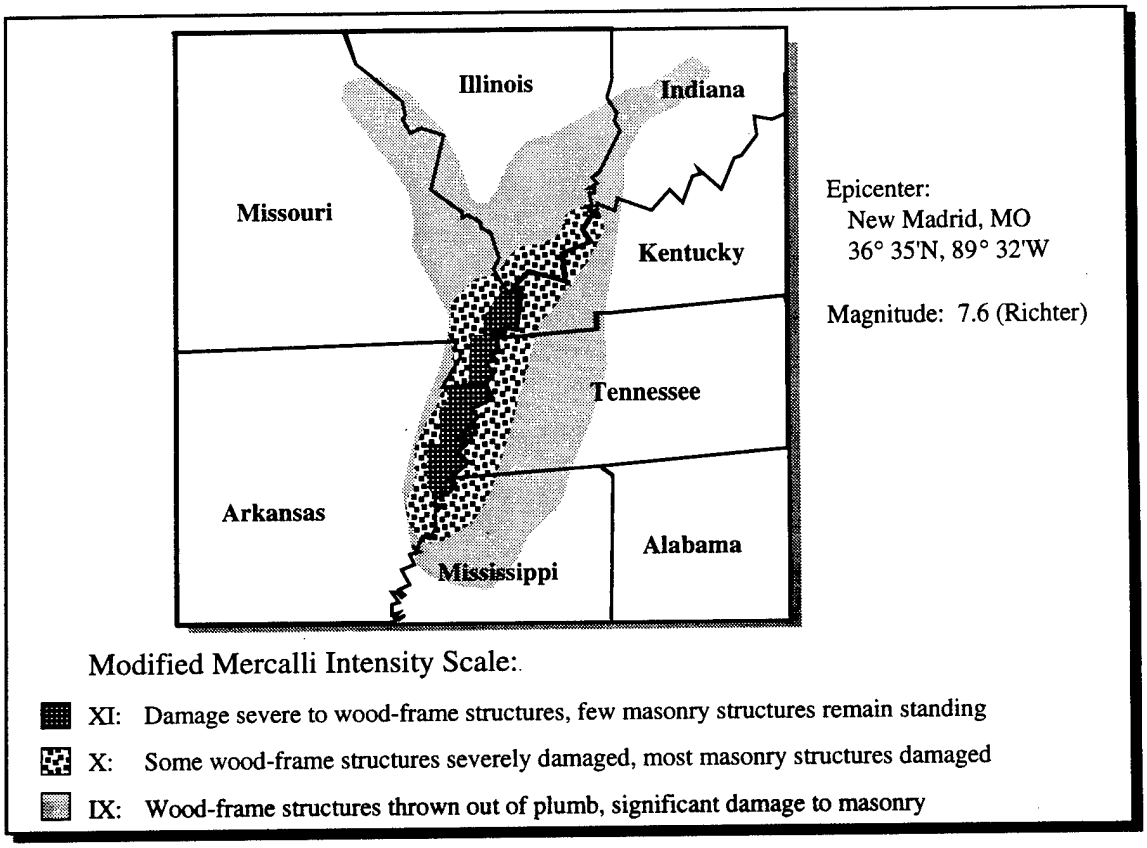

Figure 2.2. Damage Extent of New Madrid Earthquake

The specific scenario, as published in the program for Demo '94, follows:

At 2:31 AM Central Standard Time (CST) on October 24, 1994, a strong earthquake occurred along the New Madrid Fault, a stretch of land approximately 300 km long and 70 km wide. The earthquake lasted approximately 21 seconds. The latest data from the United States Geological Survey (USGS) indicates the earthquake struck with a magnitude measuring 7.6 on the Richter scale. The epicenter was located outside New Madrid, Missouri, at 36° 35' north, 89° 32' west. The earthquake affected the states of Illinois, Indiana, Missouri, Kentucky, Arkansas, Tennessee, Mississippi, and Alabama. Aftershocks continue to occur, with the most significant one registering 6.6 on the Richter scale.

Although Federal, state and local planners in the affected states have long recognized the threat of seismic activity, the magnitude and duration of the event took even the most prepared responders by surprise. Many of the smaller towns along the fault have never adopted the Uniform Building Code (UBC), whose provisions specify minimum seismic tolerances be designed into all newly constructed buildings.

The damages, disruptions, casualties, and injuries caused by the earthquake have made this the most devastating natural disaster in the history of this nation. Heavier than normal rainfall during the previous weeks, and a higher than average water table contributed to numerous landslides in the hills and valleys surrounding the river basin. The wet soil failed to withstand the violent ground shaking, and gave way under the stress. Many structures withstood the earthquake only to be swept away by the moving walls of earth. Flooding is prevalent in the low-lying areas due to the damage to, and failure of, several key levees. Rescue and recovery efforts have been initiated, but are hampered by an almost complete breakdown of the transportation and support infrastructure.

Damage throughout the area ranges from slight in the outlying areas to total destruction near the epicenter. Shock waves were reported as far south as Jackson, Mississippi. Lesser shocks were reported as far away as Ohio, Massachusetts, and Washington, DC; these long-distance shocks occur because of the rigidity of the earth's crust in the middle and eastern United States. Initial estimates state that approximately 30,000 to 50,000 square miles along the fault received significant damage during this earthquake. Initial casualty estimates are high, with approximately 500 deaths, 2,000 serious trauma victims, 4,500 minor trauma victims, and the displacement of 45,000 individuals requiring shelter. Had the earthquake occurred during the daylight hours, with the road systems jammed, the schools filled, and businesses open, these figures would have been significantly higher.

Medical services throughout the area are severely burdened. The normal availability of beds and medical supplies have been reduced because of severely damaged hospital structures, and the number of surviving beds are insufficient to accommodate the injured. Damage to the transportation system is seriously hampering rescue and relief operations. The major highway systems throughout the Mississippi Valley are impassable due to collapsed bridges and upturned pavement. The railway system received similar damage. The four main utility systems: electric, water, gas, and sewer, all experienced significant losses. The electric system experienced a significant failure, causing widespread power failures throughout the area. The water and natural gas systems also experienced heavy damage due to the breakage of underground pipes. Water for drinking and sanitation is generally unavailable. Furthermore, individual and small-group structural fires that occur during the first 48 hours are extensive and are difficult to battle with the public water system having failed.

Communication capabilities were impacted immediately. Radio, television and data services were all disrupted. The PSN incurred some damage but remained in service. Buildings housing telecommunications switches remained intact due to the industry's general adherence to UBC guidelines and the relatively modern, reinforced structures that house the equipment. Only one end office, located just outside St. Louis, MO, was destroyed by fire, affecting nearly 25,000 customers. Extensive structural damage affected the "outside plant" equipment, which includes cable, antennas and telephone poles. Damage to poles caused some areas to lose all service because of local loop damage. Dial tone was slow and intermittently unavailable, even as far as 300 miles from the epicenter. High intra-LATA (Local Access and Transport Area) call volumes combined with the outside plant damage resulted in occasional blockage for local calls.

Major fiber hubs near St. Louis, Missouri were damaged when a bridge that crosses the Mississippi failed. Although Interexchange Carrier (IEC) fiber protection systems were immediately activated, the facility damage and high call volumes stressed the PSN's ability to transport calls. Network management controls were exercised in the affected area codes (314, 901, 502, and 618) restricting traffic to prevent saturation of interexchange and local exchange carrier networks. The major IECs reported that calling volume into the disaster area rose to 48 million attempted calls daily, resulting in 28 million calls blocked by management controls.

The extensive loss of commercial power is an additional threat to the telecommunications infrastructure. Due to the lack of commercial power, the telecommunication facilities in the affected region are operating on generator and battery power. If not resupplied, fuel for these systems should expire in the next 24 to 48 hours.

Cellular systems initially received the heaviest damage, as the effects of the earth shaking knocked cell sites out of alignment. Additional damage to the cellular systems included downed towers, loss of power, and extensive antenna damage. In one Metropolitan Service Area (MSA), a cellular carrier lost its interface to Southwestern Bell.

The Governors of the affected states have requested immediate Federal assistance due to the disaster's magnitude. In response to the Governors' requests, the President immediately declared states of disaster in the affected counties and parishes, and promised prompt and comprehensive assistance to the citizens of the region. The Governors have also ordered the activation of their Army and Air National Guard units to assist in rescue and recovery operations.

The National Coordinating Center (NCC), in coordination with the Federal Emergency Communications Coordinator (FECC) has determined that mobile telecommunication assets should be used to restore connectivity from the St. Louis end office. The NCS, in conjunction with the Department of Defense (DoD), and the National Guard Bureau, coordinated the use of mobile telecommunication assets.

Federal response to the earthquake is significant. Federal emergency response personnel are operating on the affected area to facilitate response activities and direct federal efforts. Due to damaged telecommunication capabilities and the use of widespread call blocking procedures, emergency response personnel are experiencing difficulty completing calls using commercial capabilities without the use of special priority codes. Consequently, many federal emergency response personnel are making use of GETS, which allows them priority call access and routing. This service was recently implemented and this disaster comprises the first operational use of GETS.

After the first day of Federal response activity, during which many government personnel are using GETS to circumvent call blocking procedures, an IEC notes GETS Personal Identification Number (PIN) use beyond the established thresholds for GETS users and notifies the integration contractor, GTE. Specifically, the carrier has found that multiple calls are being initiated from several locations in the areas affected by the quake, and other

locations well outside the affected region, including Los Angeles and New York. Some of the calls seem to be originating simultaneously. Shortly thereafter, the other two IEC's report similar activity on the same PINs. Through the GETS Network Management Operations Center (NMOC), GTE notifies the GETS Operations Duty Officer and describes the scope of the fraud and the PINs involved. The Duty Officer in turn attempts to locate the GETS users' Points of Contact (POCs) to determine whether the usage is legitimate.

The NS/EP POCs report that one of the two PINs identified by GTE has in fact been used for fraudulent calls. This information is relayed to the IECs through the GETS Integration Contractor, GTE, and GTE immediately initiates the process to issue a new PIN to the user and deactivates the compromised PIN.

2.2 THE CONFIGURATION

The diagram in Figure 2.3 (p. 2-7) is the general network topology for the Demonstration. The GTE Chantilly site was the simulated command center, providing at least one end of each demonstration call. Other sites included: Jefferson Barracks, MO; Geneva, Switzerland; Flint Ridge, CA; Dallas, TX; and Arlington, VA.

A T1 link between Jefferson City and GTE Chantilly provided connectivity for voice, video and data between the two demonstration sites. A tropospheric radio system (TRC-170), tied to the Mobile Subscriber Equipment (MSE) tactical communications system provided by the Missouri National Guard, provided phone service from the Barracks to Jefferson City, MO and the PSN. Also, Defense Switched Network (DSN) and FTS2000 connectivity were provided through AT&T between Jefferson Barracks and the GTE Chantilly site.

The video feed, data sources and tactical voice are combined through the Integrated Digital Network Exchange (IDNX) communications resource manager, which establishes on-demand commercial T1 signals. Those signals are then carried to a surviving PSN entry point from the remote disaster area. A digital interface device converts the T1 signals to tactical carrier rate which can be sent over the TRC-170 radios. Finally, the signals are demultiplexed to produce the voice, data and video.

High Probability of Completion (HPC) and Advanced Intelligent Network/Integrated Services Digital Network (AIN/ISDN) leading edge technologies were demonstrated using the MCI network. HPC calls were processed through the Laurel, MD end office (EO), and a protocol analyzer in the GTE Auditorium showed the HPC codepoint. The New Jersey site provided a data source for the AIN/ISDN demonstration. A database sent data through MediaCom Servers which rode an X.25 connection to the New Jersey Bell Public Packet Switched Network (NJB PPSN), where MCI picked up with an X.75 connection. Voice, data and video transmissions that could aid in disaster relief were demonstrated.

The Advanced Communications Technology Satellite (ACTS) capability showcased the use of satellite links and T1 Very Small Aperture Terminals (VSATs) to connect isolated users to GETS. The origination from GTE Chantilly was sent to a T1 VSAT at MITRE and

subsequently transmitted to the ACTS. The signal was received at the T1 VSAT located at Jet Propulsion Laboratory (JPL), Pasadena, CA and entered the PSN through the Flint Ridge, CA EO. The call was sent to the Herndon, VA EO and a second phone at GTE Chantilly.

The Asynchronous Transfer Mode (ATM) demonstration had a basic configuration of an ATM switch at the Sprint network connecting to the Chantilly site via an OC-3 link. The video and data transmitted illustrated the breakthrough speeds possible with ATM.

Cellular restoration was demonstrated with Telular phonecells and site cells. A disconnection of the local Private Branch Exchange (PBX) triggered a switch to cellular access from the local Mobile Telephone Switching Office (MTSO), thus maintaining phone service and allowing GETS access.

The outbound international call used an IEC to access GETS, while the inbound international call used DTS, which connects to the Beltsville International Voice Gateway.

AT&T demonstrated a 4ESS Switch Restoral in Dranesville, VA. Audience members witnessed AT&T's configuration for emergency switch restoral and disaster recovery. This process restored PSN and GETS access to customers.

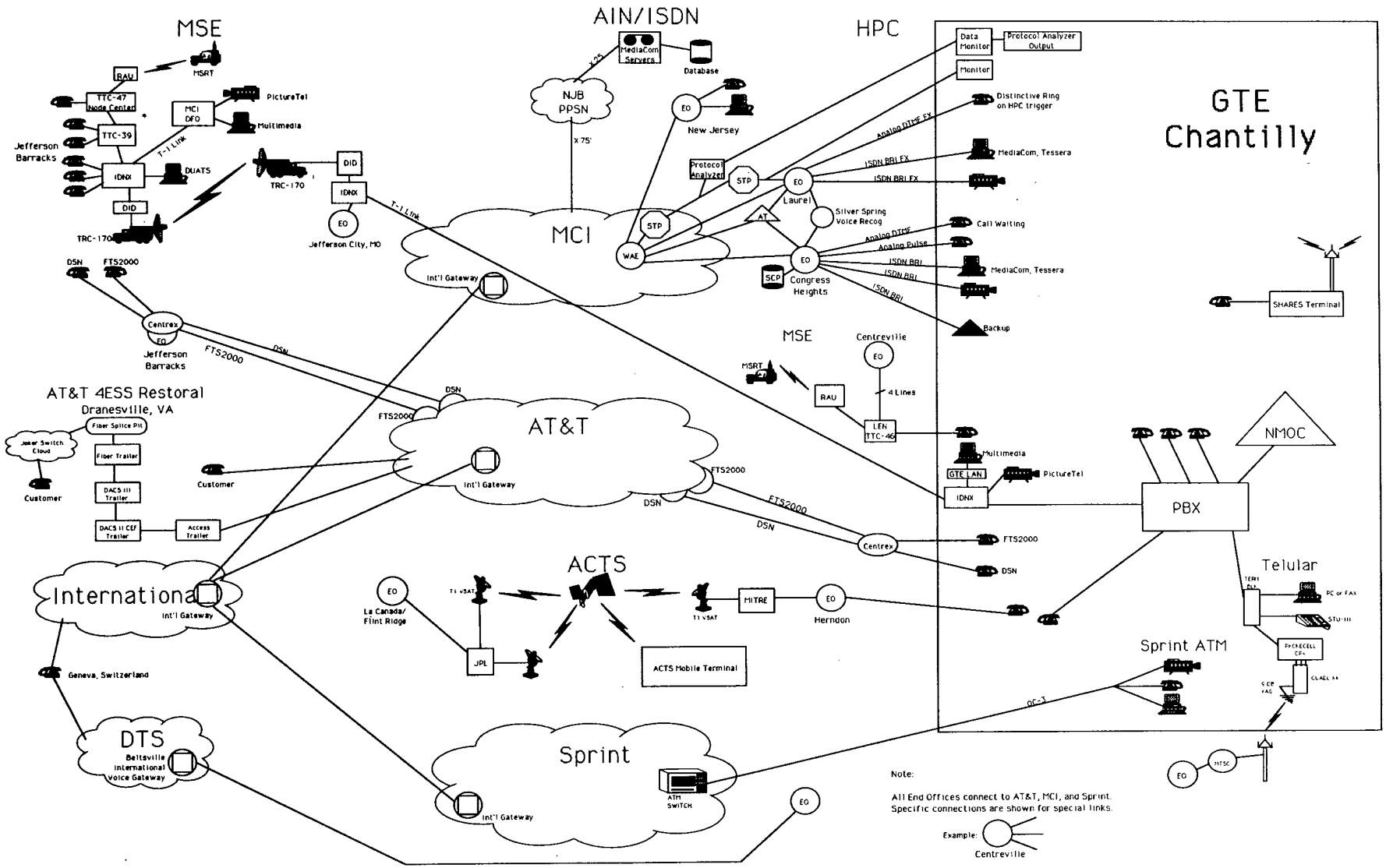

Figure 2.3. Demo '94 Master Plan

SECTION 3

DEMONSTRATION DESIGN

3.1 DESIGN OVERVIEW

Demo '94 was designed as a thorough multi-site demonstration of GETS. The GTE facility in Chantilly, VA was used as the primary focus for displaying these capabilities. A multimedia format detailed the GETS Core Capabilities (see Figure 3.1), leading edge services and industry-sponsored items.

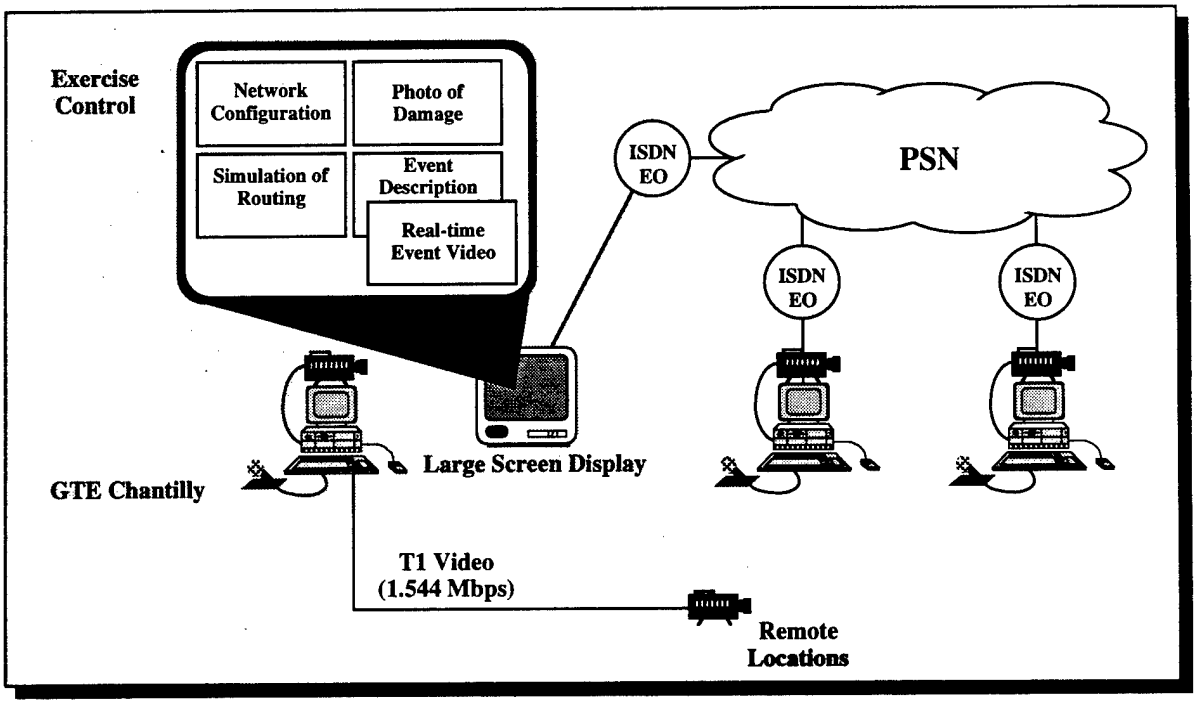

Figure 3.1. Multimedia Presentation of Demo '94

GETS LC functions are derived from the use of the 710 Numbering Plan Area (NPA) for access to the functions, features and capabilities provided by AT&T, MCI, and Sprint.

3.2 GETS BASIC FUNCTIONS

Voice and voice band service was demonstrated by placing a series of scenario related calls from actual and simulated locations within the earthquake area. The calls utilized several types of communications capabilities including PBXs, cellular phones, and single line business phones. In addition, speed dialers and auto dialers of several varieties were employed. Voiceband service is depicted in Figure 3.2.

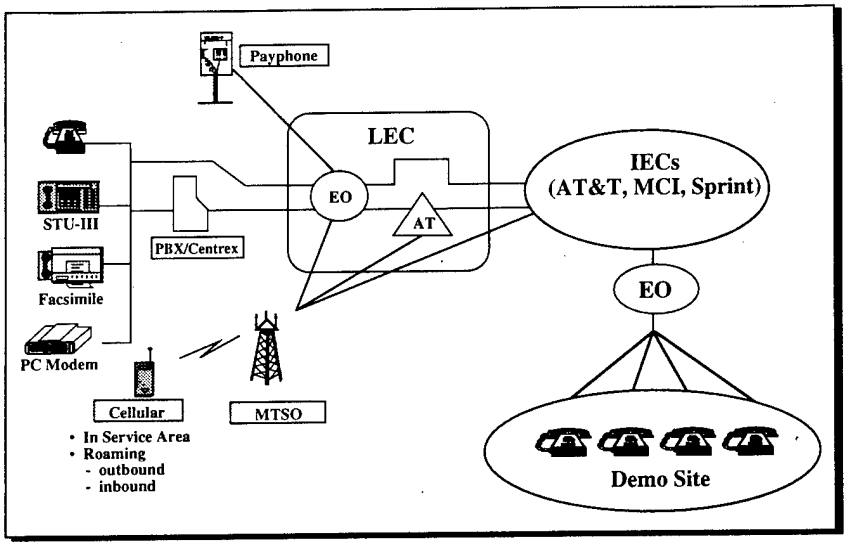

Figure 3.2. Voiceband Service

3.3 INTEROPERABILITY

A major strength of GETS is interconnection with other networks. GETS can use both civilian and military systems. The systems connectivity exhibited at Demo '94 were MSE, DTS, FTS2000 and DSN.

3.3.1 Tactical Military Systems

MSE functionality was demonstrated by deploying National Guard MSE assets consisting of both cellular and wireline capability (see Figure 3.3). AN/TRC-170 tropospheric radio was used to connect the MSE to the Local Exchange Carrier (LEC) in Jefferson City, MO. Scenario related GETS calls were placed between the deployed location and the simulated control center in GTE Chantilly.

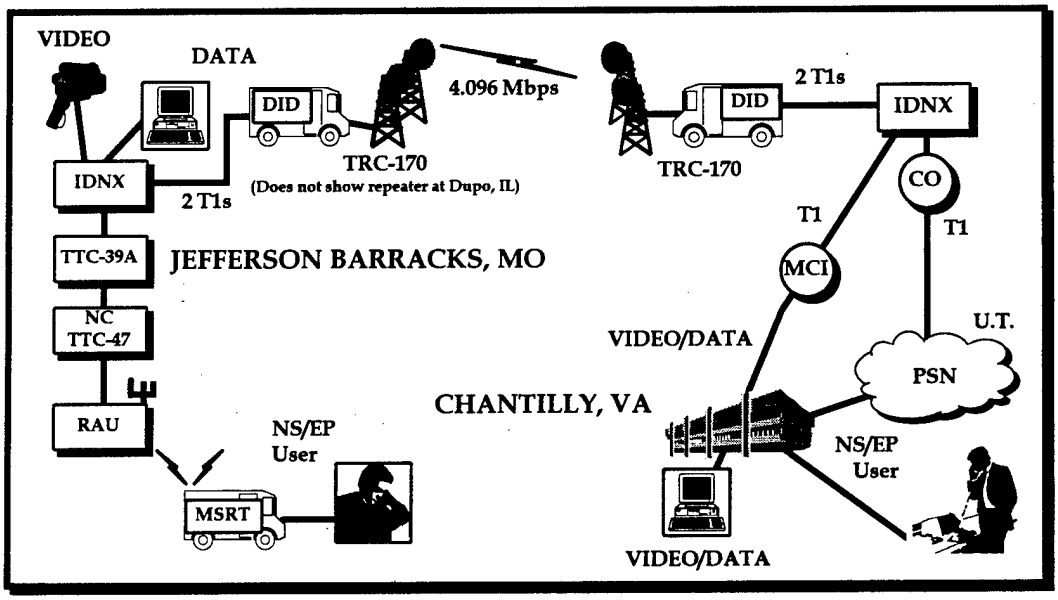

Figure 3.3. MSE and AN/TRC-170 Interface into the PSN and GETS

Figure 3.4 denotes the setup connecting the MSE to the Demo site in Chantilly. MSE from the Maryland National Guard was deployed at Chantilly, allowing audience members to use the equipment themselves.

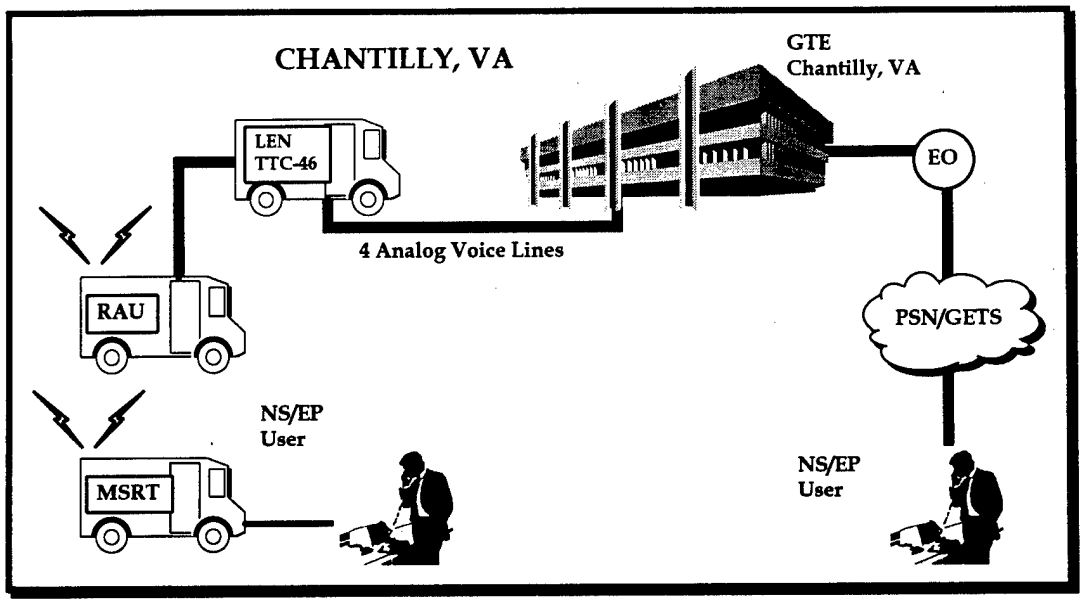

Figure 3.4. MSE Deployed at GTE Chantilly

3.3.2 FTS2000/DSN

Access from FTS2000 was demonstrated by placing one GETS call from Jefferson Barracks to the simulated control site in Chantilly, VA using On-Net access to FTS2000 Network A, as shown in Figure 3.5.

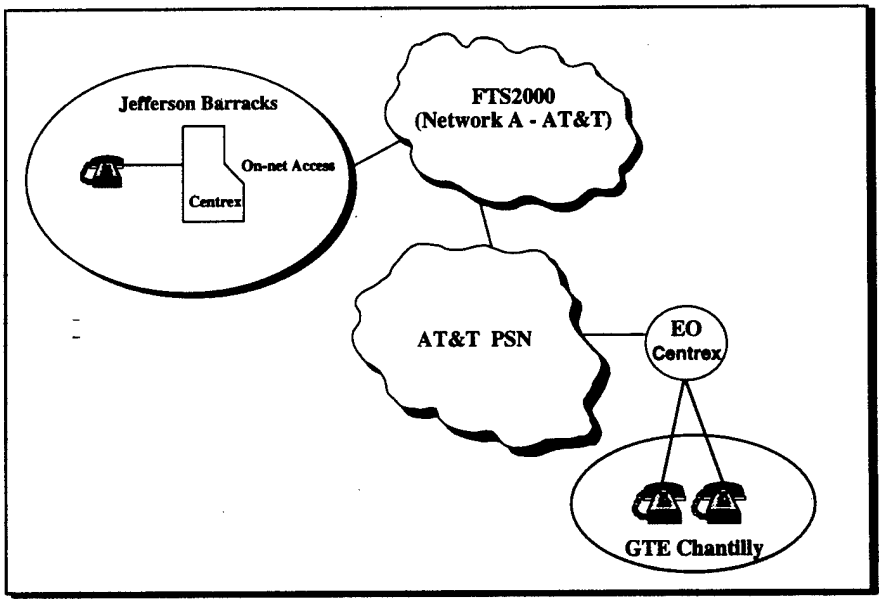

Figure 3.5. Access from FTS2000

Access from DSN was demonstrated by placing one GETS call from Jefferson Barracks to the control site in Chantilly, VA. Figure 3.6 illustrates the implementation. Also, the audience members were given the opportunity to make FTS2000/DSN calls from the Chantilly site using GETS.

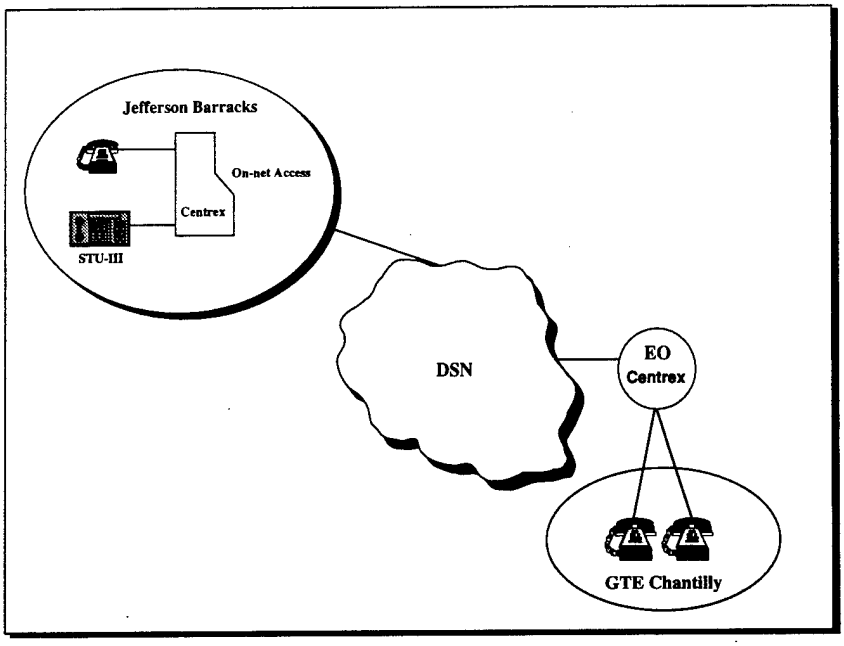

Figure 3.6. Access from the DSN

3.4 OPERATIONS, ADMINISTRATION, AND MAINTENANCE (OA&M)

In addition to the core communications functions of GETS, there are several functions that are necessary to maintain effective operations of the service. GETS administration is embodied by the joint efforts of the NCS, the GETS Integration Contractor and the three GETS IECs. Most of these functions are transparent to users; however, the functions included in Demo '94 as part of GETS OA&M are those that most directly affect users. Those functions are PIN Management, Fraud and Abuse Control, and User Assistance. Demonstration attendees witnessed the process used by the NCS GETS Administration Center, the GTE Network Management Operations Center and the three IEC operations centers to provide service to users and to detect and eliminate fraudulent use of GETS. The strong fraud prevention safeguards built into GETS assure that the service is used only for legitimate purposes. Figure 3.7 shows the structure of GETS OA&M.

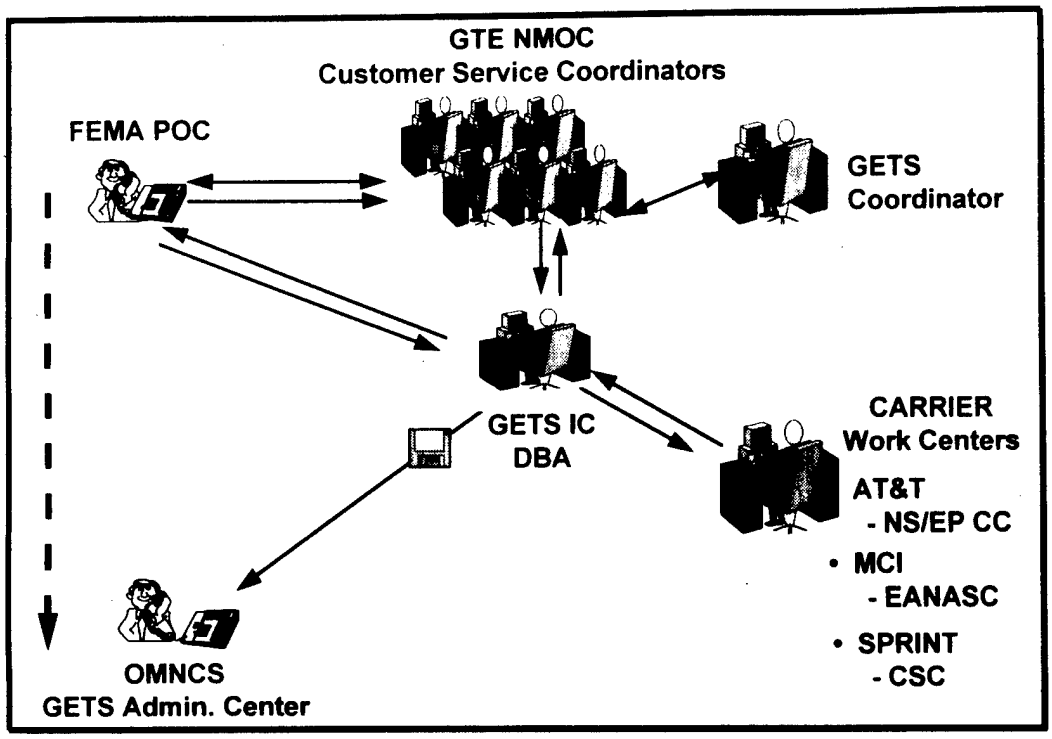

Figure 3.7. GETS OA&M Structure

3.4.1 PIN Management

PIN management was demonstrated by issuing PINs to users. Users were located at the control center in Chantilly, VA and at Jefferson Barracks, MO (Figures 3.8 and 3.9). There were two types of new PINs: NCS stockpiled PINs, which are already activated within the IECs, and new PINs, which will require issuance by the Integration Contractor (IC) and activation by the IECs.

3.4.2 Fraud and Abuse Management

Fraud and Abuse Management was simulated with two PINs that were suspected of fraud. Whenever fraud or abuse is suspected on a particular PIN, the IECs notify the GETS Administration Center of the possible compromise. The GETS Administration Center then notifies the GETS POC to confirm suspected fraud. If the fraud is confirmed, the compromised PIN is deactivated and a new PIN is issued to the previous user of the compromised PIN.

3.5 LEADING EDGE TECHNOLOGIES DEMONSTRATIONS

Leading edge functions for GETS are those functions that are not yet fully deployed or developed but have potential to support the NS/EP community as GETS and the PSN evolve. These include HPC, ISDN, AIN, ACTS and Shared High Frequency (HF) Resources (SHARES) Telephone Interface (STI).

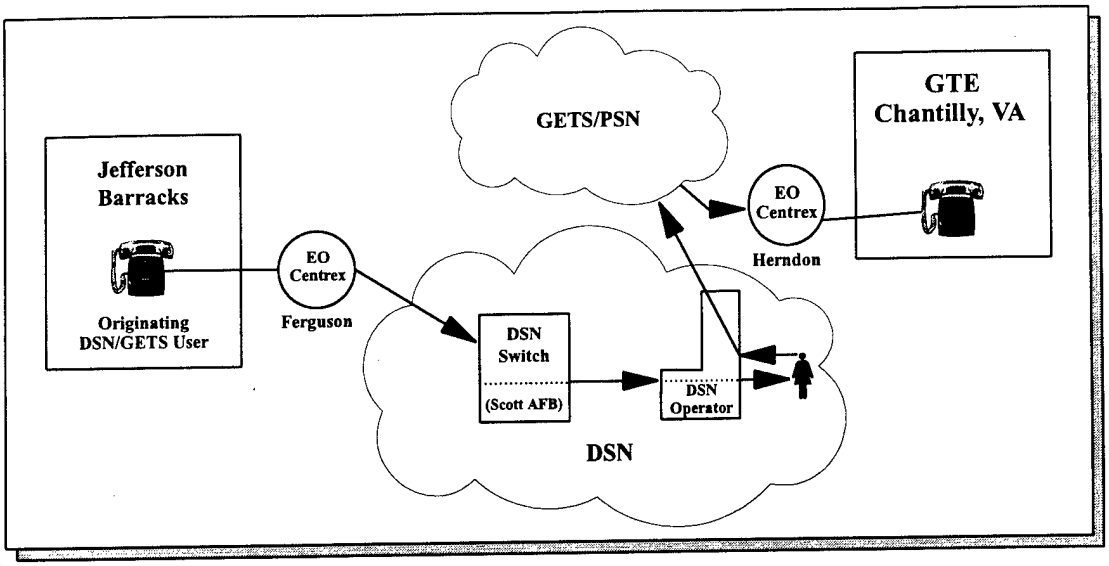

Figure 3.8. GETS Access from DSN (Jefferson Barracks)

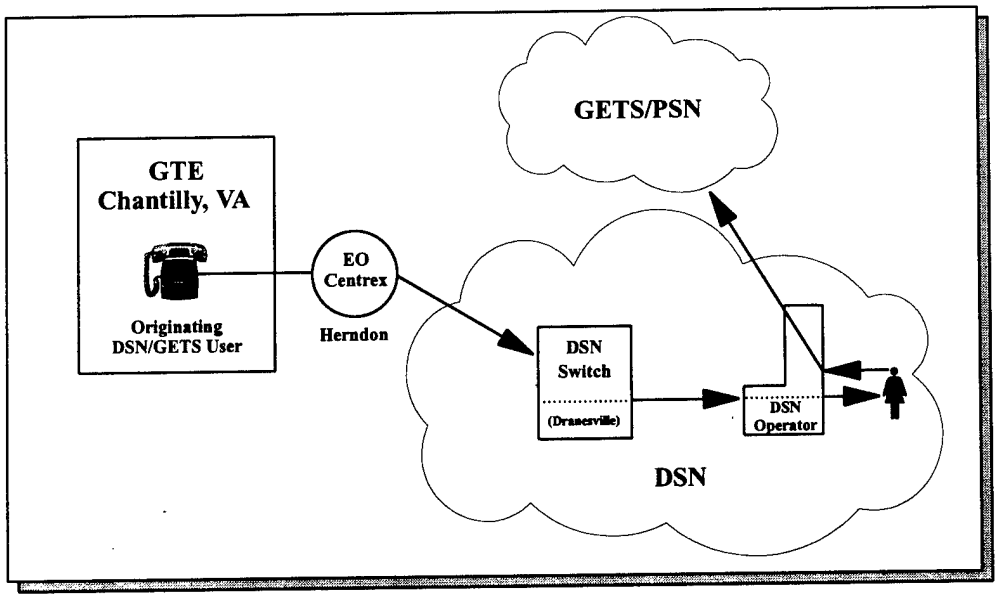

Figure 3.9. GETS Access from DSN (Chantilly, VA)

3.5.1 HPC

The recently adopted American National Standards Institute (ANSI) standard for HPC (ANSI T1.631-1993) has been implemented within the MCI network. GTE, in conjunction with MCI and Bell Atlantic, demonstrated the setting of the proper parameter within the Signaling System 7 (SS7) protocol. The parameter will identify the GETS call in the MCI network and pass the parameter to Bell Atlantic so priority call processing can be handled across network boundaries. The HPC functionality was demonstrated by comparing Plain Old Telephone Service (POTS) and GETS treatment for calls placed within the auditorium. The HPC call identifier triggered a distinctive ring and the HPC bit was "captured" and displayed via a protocol analyzer. The ability to identify GETS calls across different carriers' network boundaries is a critical element of providing end to end priority call completion for NS/EP calls. Figure 3.10 denotes the implementation.

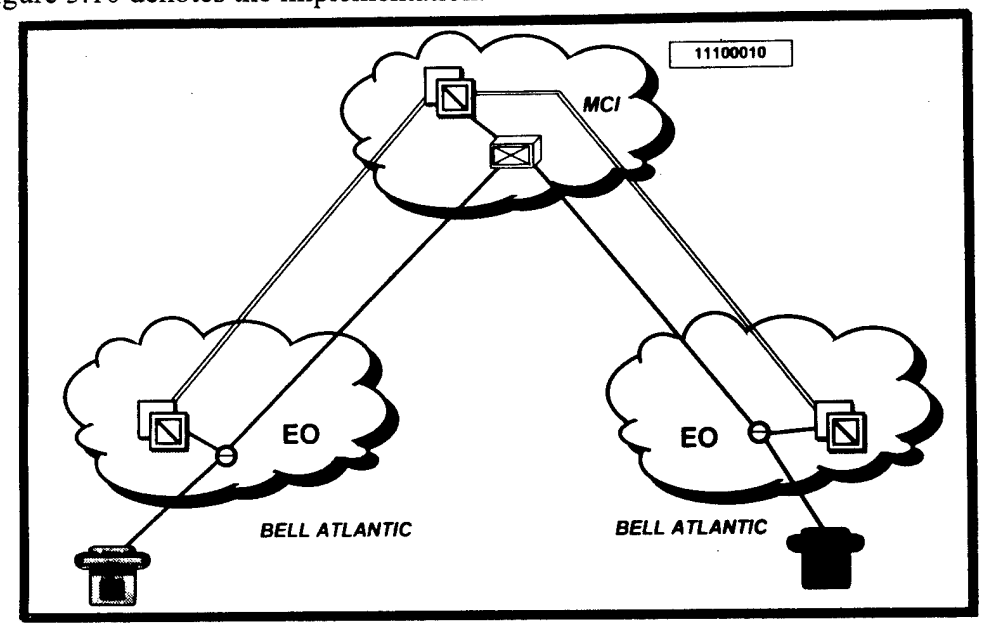

Figure 3.10. HPC

3.5.2 ACTS

The ACTS, launched by NASA on September 12, 1993, is an experimental satellite operating in the K-band (30 and 20 GHz). It is intended to provide US Government and industry an opportunity to experiment with new commercial satellite technologies. The Office of the Manager, NCS (OMNCS) has sponsored experiments in communications restoral, secure communications, and interoperability with the PSN in an effort to show the utility of ACTS in serving NS/EP users.

ACTS is a key element in NASA's program of developing high-risk, advanced communications technology that is usable in multiple frequency bands to support our Nation's future communications needs. Realizing this goal will enable growth in capacity, effective use of the frequency spectrum, and more cost-effective delivery of existing services and will maintain the United States preeminence in satellite communications.

Demo '94 used ACTS with a T1 VSAT terminal. The T1 VSAT provides 1.79 Mbps of capacity or 28 64-kbps circuits through a 1.2m antenna. NASA also provided the ACTS Mobile Terminal (AMT) for viewing by audience members; due to other operations on the ACTS, no calls were made through the AMT. The AMT provides 512 kbps throughput on a .06 x .15m antenna. Figure 3.11 illustrates the ACTS interconnection.

The use of ACTS was demonstrated using two of the ACTS VSAT earth stations; one at MITRE in Reston, VA and one at JPL in Pasadena, CA to make GETS calls between PSN islands. Both ends of the call terminated in the GTE Chantilly auditorium.

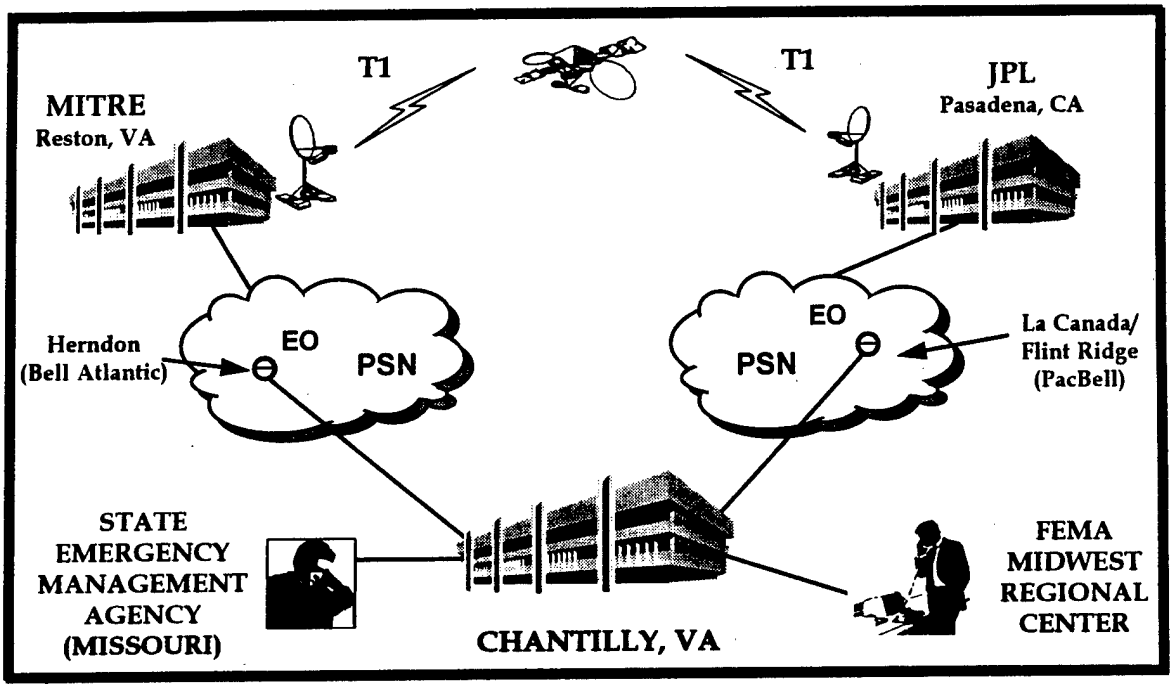

Figure 3.11. ACTS

3.5.3 SHARES

The SHARES HF Radio Program was established in 1989 by the OMNCS to implement a national HF radio network to support NS/EP functions. Currently, over 1050 HF radio stations representing 46 Federal, state, and industry organizations participate in SHARES. Demo '94 showcased a new capability being developed by SHARES, the STI, which enables an HF radio automated digital interface unit to serve isolated telephone subscribers. The subscriber only needs a telephone, the telephone number of a remote, unmanned HF transceiver, a PIN, and a destination number (telephone number to be called); no familiarity with HF radio procedures is necessary. The demonstration consisted of placing of a GETS call from Chantilly, VA to Jefferson Barracks in MO.

Two HF radios and two STIs were used to demonstrate the STI capability to bridge disrupted portions of the PSN, as shown in Figure 3.12.

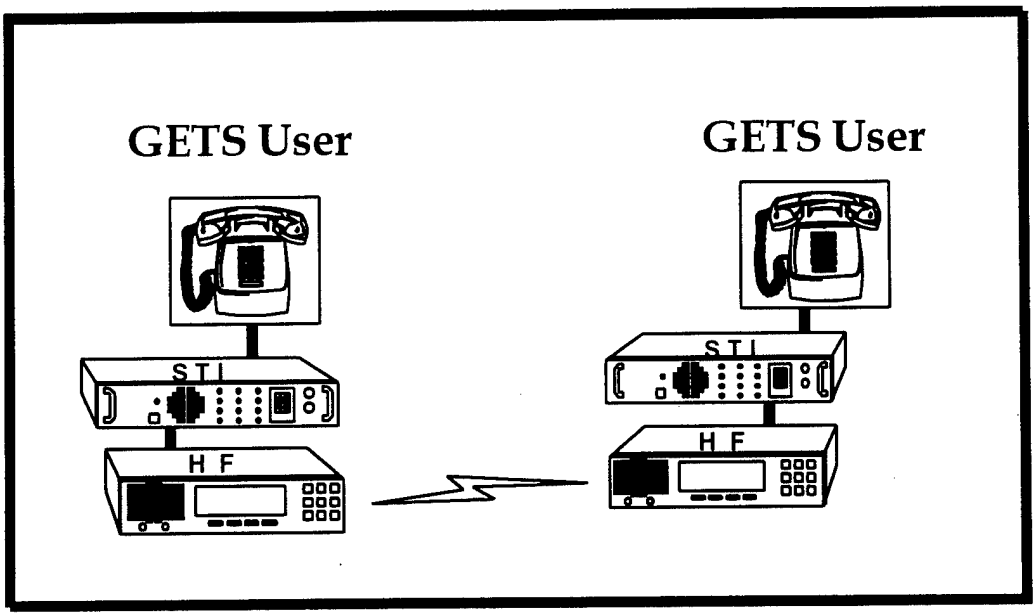

Figure 3.12. SHARES

3.5.4 AIN/ISDN

Bellcore began its demonstration by placing GETS calls between two Bell Atlantic ISDN end offices using ISDN basic rate interface. This demonstrated the ability to place ISDN calls with GETS functionality. Additional AIN functions were demonstrated as depicted in Figure 3.13. A major AIN capability was voice recognition for PIN validation. Also, video, data transfer, secure E-Mail, voice mail and paging were showcased along with real-time data conferencing.

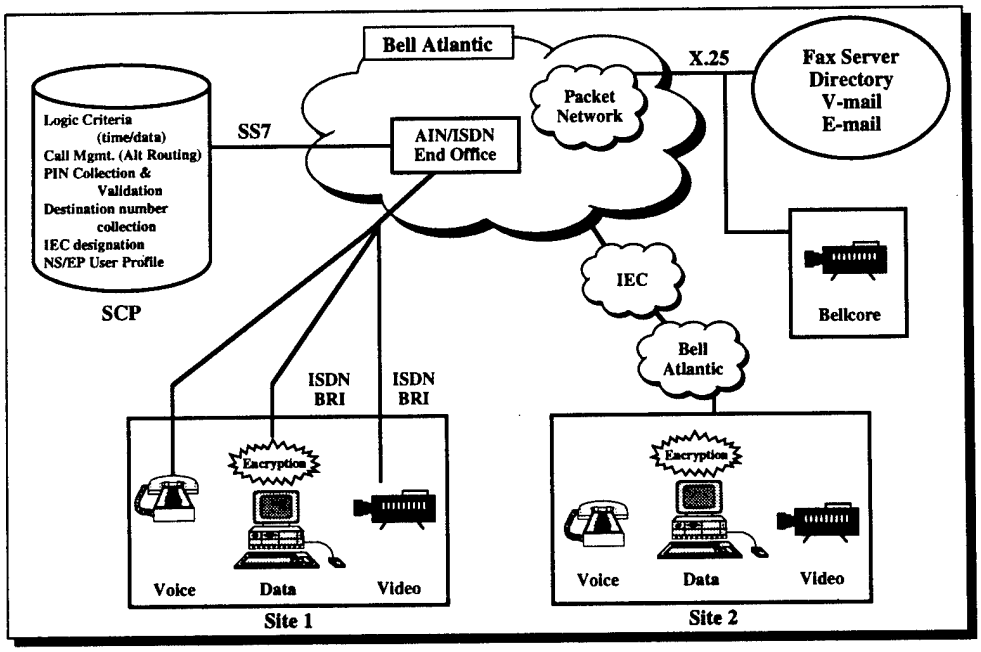

Figure 3.13. AIN/ISDN

The President's National Security Telecommunications Advisory Committee (NSTAC) and the OMNCS have identified the AIN as having potential to provide access control, priority treatment, user authentication, and other survivability features supporting NS/EP telecommunications. The OMNCS has established an AIN Program to address the emerging technology and an associated AIN Program Office to plan, coordinate, and oversee the effort.

3.6 INDUSTRY SPONSORED DEMOS

Industrial advances have direct applicability to NS/EP telecommunications and complement the GETS role. They offer functions and capabilities that can work side by side with GETS in completing a communications presence in many emergency scenarios. The demonstrations sponsored here are Asynchronous Transfer Mode, PBX restoral through an alternate cellular network, and 4ESS switch restoral.

3.6.1 ATM

An ATM demonstration used Sprint and Bell Atlantic services to show the utility of ATM in disaster relief services. The major benefit shown during Demo '94 was fast transmittal of large weather images; ATM proved 30x to 60x faster than standard T3 Internet connections. The demonstration was originally prepared by the Naval Command, Control and Ocean Surveillance Center's Research and Development Division (NRAD). The images and photography used in Demo '94 were provided by the Earth Resources Observation Systems (EROS) data center in Sioux Falls, SD. The setup is shown in Figure 3.14.

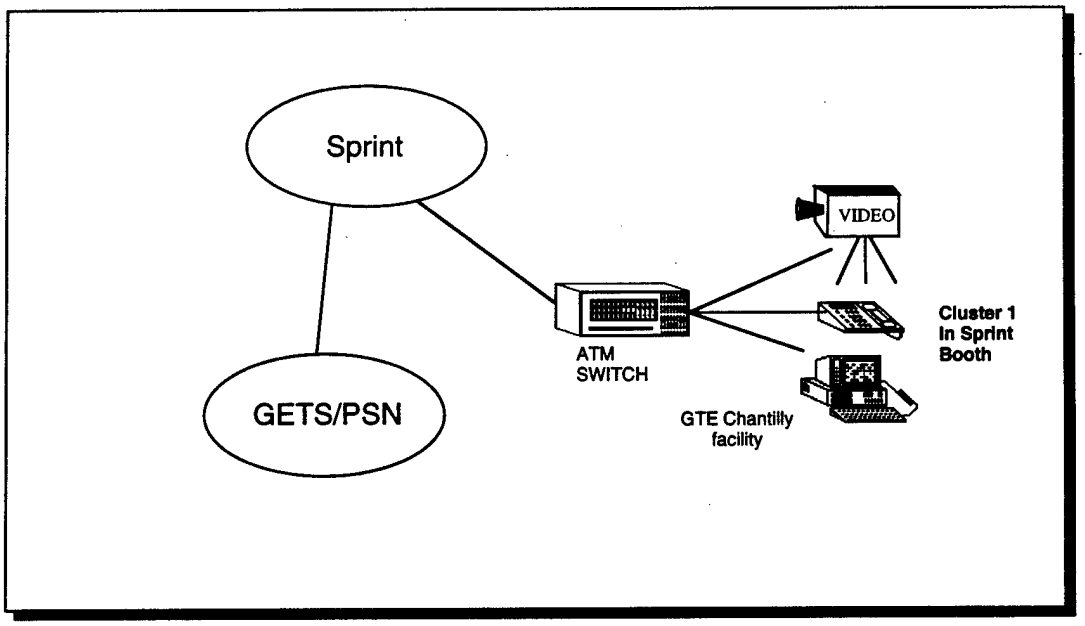

Figure 3.14. Gigabit Networking Using ATM

3.6.2 PBX Restoral Via Cellular

Restoral of wireline communications through a PBX using a hot standby cellular product developed by Telular was demonstrated as a capability available to users to enhance emergency preparedness (see Figure 3.15).

Phonecell CPX provides a cellular backup for up to 12 PBX lines on each CPX unit. The optional Cel Switch line fault detector connects users to an Mobile Telephone Switching Office (MTSO) within 60 seconds of detecting loss of landline connectivity. The Phonecell CPX allows Dual-Tone Multi-Frequency (DTMF) after-dialing, thus providing compatibility with the GETS architecture.

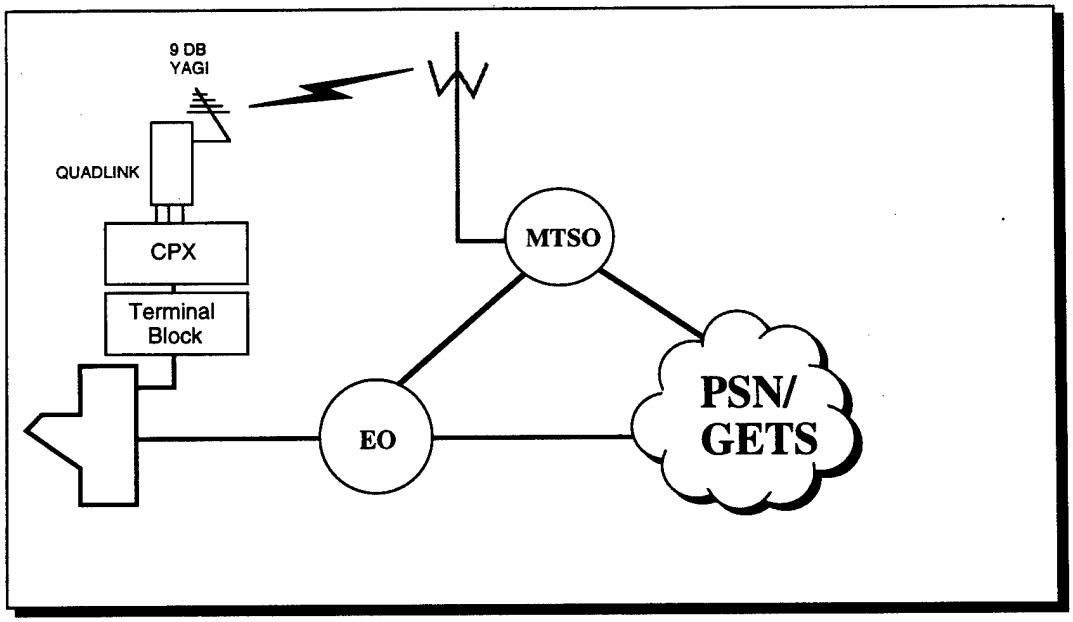

Figure 3.15. PBX Restoral Via Cellular

3.6.3 AT&T 4ESS Switch Restoral

The ability to restore complete functionality of a destroyed 4ESS within the AT&T switched network using a remote switch was demonstrated at Dranesville, VA. Using Disaster Restoration Trailers and Disaster Restoration 4ESS, local telephone service was re-established. GETS calls were placed through the "joker" 4ESS (see Figure 3.16). In addition, AT&T provided a public use phone bank connected to Bell Atlantic and the "joker" 4ESS. A number of trailers containing switching equipment patched into the "joker" switch and an AT&T entry point. Signals from the AT&T Switched Network were sent to an Access Trailer, then through Digital Access and Cross-Connect System (DACS) II CEF and DACS III Trailers. The connection ran through a Fiber Trailer and finally into the Fiber Splice Pit where the signals reconnect with the "joker switch" cloud.

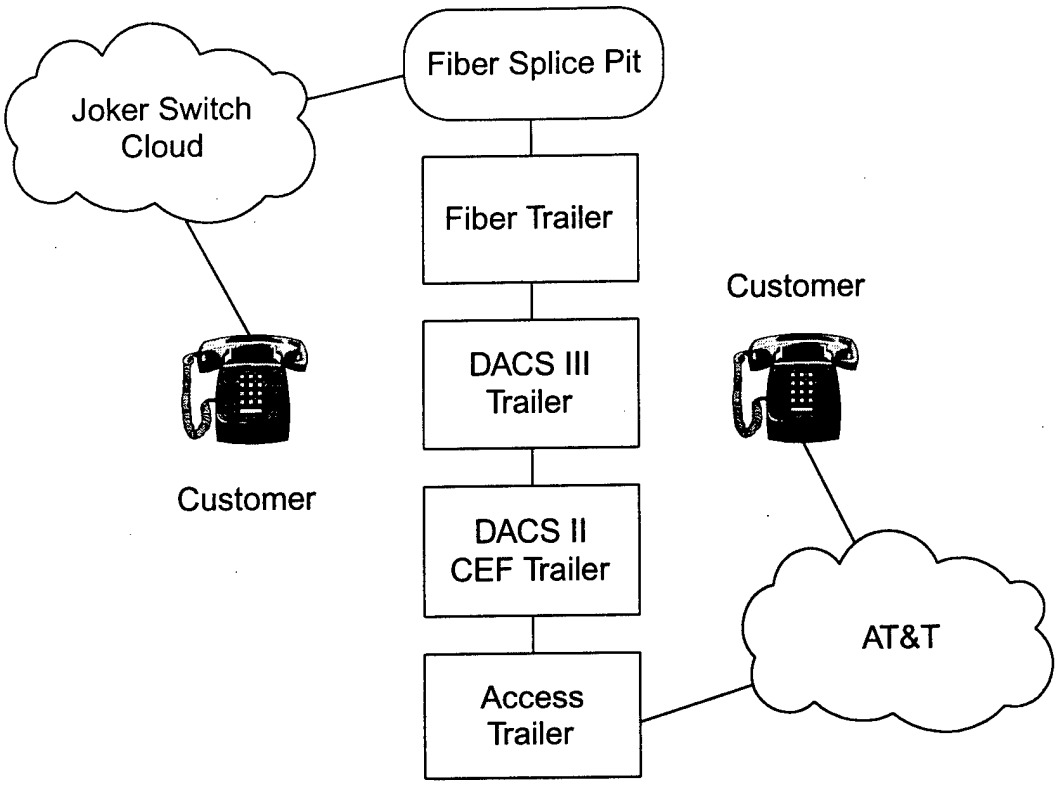

Figure 3.16. AT&T 4ESS Switch Restoral

SECTION 4

LESSONS LEARNED

Demo '94 was a large, complex effort involving multiple organizations, interrelated activities and much coordination. Overall, the effort went smoothly and was considered by virtually everyone to be very successful. The key to that success was team work. There were many opportunities for participants to say that it wasn't their job or that something couldn't be done, but that didn't happen. Everyone wanted a successful demonstration and worked toward that end. There were several items of note that resulted from the demonstration. They are indicated below:

1. The successful production and presentation of Demo '94 provided high, positive visibility to GETS and resulted in a high degree of interest from many potential users. The integration of different components from different vendors pronounced the interoperability of the telecommunications world, and helped to highlight the GETS capabilities. Over one hundred people from twenty different organizations made this production a success.

2. Organizing and structuring the Demonstration into a cohesive theme proved successful. While a lecture formatted presentation could have given the same information, the walk through of a mock disaster accented the utility and practicality of GETS, without losing the audience in technical details. Showcasing GETS capabilities in a user-oriented fashion, without detailing it's inner workings, helped to attract the audience and focus on it's effectiveness. By the end of the Demonstration, the audience had a clear idea of what role GETS was to fulfill and how users can access it.

3. Major PBX and CENTREX managers should be made aware of GETS 710 access in order to achieve a high degree of availability. In several cases PBX managers had not opened 710 as a valid code until they were specifically requested to do so.

4. Operator assistance is necessary to complete some GETS calls. After reaching GETS, a user must enter a PIN and destination number using DTMF tones. Some systems or service configurations do not allow the generation or passing of DTMF tones after initial dialing is complete (i.e., 710-627- 4387). As a result, GETS was not always easily accessible. Human intervention can and does succeed when particular systems (i.e., MSE or PBX's) do not pass DTMF tones. Operator intervention was successful in MCI and Sprint.

5. The combination of military and commercial services was successfully showcased in the demonstration. However, one call was not executed properly because the lines connecting the end office to the AN/TTC-39 were not given a trunk hunt subgroup. Thereby, when a card in the AN/TTC-39 failed, the call did not search for another line and was left uncompleted. This affected GETS accessibility and should be considered when preparing for an actual emergency.

6. The ordering of ISDN circuits for the Demo was not a simple matter. Because of the lack of standardized packages or groups of components and services, determining the exact hardware required was difficult. Many circuits had up to 60 different parameters or variables that could be chosen and specified. Many of these were unfamiliar to individuals ordering the circuits and individuals taking the orders. Without detailed knowledge of the hardware and this new service, obtaining the correct equipment was not trivial.

APPENDIX A

PARTICIPANTS

Missouri			
Name	**Company**	**Name**	**Company**
Wells, Sam	AQC	Poore, Tom	GTE
Sickle, Kevin	GTE	Sebren, Fred	MCI
Smagacz, Teresa	MCI	Ahlen, SMS Larry	Missouri Air National Guard
Barton, Col. Hugh	Missouri Air National Guard	Gunning, Chief MSGT Richard	Missouri Air National Guard
Larrow, SGT Michael	Missouri Air National Guard	Naeger, SMS John	Missouri Air National Guard
Gunn, SGT Russell	Missouri Air National Guard	Riggs, Captain Mike	Missouri Army National Guard
Masso, Tom	Missouri National Guard HQ	Sparrow, Victor	NCS
Belisle, Ken	NET	Alsmeyer, Carl	Raytheon
Hunt, Andrew	SAIC	Nelson, David	SEMA
Roberts, Gary	SEMA	Stieferman, Allan	United Telephone
Virginia			
Name	**Company**	**Name**	**Company**
Nelson, David	AQC	Wells, Sam	AQC
McCartney, Robert	Artel	Reinke, David	Artel
Stauffer, Dale	Artel	Withey, James	Artel
Dunn, Bob	AT&T	Roos, Fred	AT&T
Stark, Larry	AT&T	Crosby, James	Bell Atlantic
Edwards, Brenda	Bell Atlantic	German, Tracy	Bell Atlantic
Godfrey, Nancy	Bell Atlantic	Langston, Randy	Bell Atlantic
Sellman, Sue	Bell Atlantic	Skidmore, Steve	Bell Atlantic
Anzivino, Anthony	Bellcore	Lakshmanan, Kris	Bellcore
Meyers, Glen	Bellcore	Perry, Ronald	Bellcore
Viego, Adrian	Bellcore	Deshler, William	Booz•Allen & Hamilton
Hoyt, Judith	Booz•Allen & Hamilton	Little, Brenna	Booz•Allen & Hamilton
Lyman, Janet	Booz•Allen & Hamilton	Mitchell, Anthony	Booz•Allen & Hamilton
Ruelle, Gerard	Booz•Allen & Hamilton	Shapaker, Mike	Booz•Allen & Hamilton
Yokely, Rhonda	Booz•Allen & Hamilton	Morrison, Lew	CFSE
Mosley, Vernon	CFSE	Allard, Chuck	GETS IC, Martin Marietta
Beck, Brad	GETS IC	Boswel, Sid	GETS IC

Cain, David	GETS IC	Dunklegerger, Steve	GETS IC
Eick, Nancy	GETS IC	Graham, Neil	GETS IC
Griesse, Ron	GETS IC	Hall, Linda	GETS IC
Hoang, Phil	GETS IC	Hoeflinger, Bill	GETS IC, Titan
Jones, Brenda	GETS IC	Kackley, Millie	GETS IC
Lu, Pat	GETS IC	Madden, Lesa	GETS IC, GTE
Maher, Michael	GETS IC	Negash, Saud	GETS IC, Martin Marietta
Nelson, Jay	GETS IC	South, Stefan	GETS IC
Waterman, Dick	GETS IC	Zayatz, Janet	GETS IC
Bibb, Bruce	GTE Federal Systems Division	Bishop, Bob	GTE Federal Systems Division
Brienza, Nick	GTE Federal Systems Division	Burke, Robin	GTE Federal Systems Division
Choffel, Mike	GTE Federal Systems Division	Evans, Don	GTE Federal Systems Division
Galloway, Keith	GTE Federal Systems Division	Klimkiewicz, Mike	GTE Federal Systems Division
Marcy, Jon	GTE Federal Systems Division	Okeson, Lars	GTE Federal Systems Division
Purnell, P.J.	GTE Federal Systems Division	Reid, Jeff	GTE Federal Systems Division
Ruggerio, Rob	GTE Federal Systems Division	Sherwin, Ron	GTE Federal Systems Division
Swartwood, Bob	GTE Federal Systems Division	Tredinnick, Dick	GTE Federal Systems Division
Wright, Brenda	GTE Federal Systems Division	Abbe, Brian	JPL
Nakamura, Dan	JPL	Scott, Donald	JPS Communications, Inc.
Bornemann, William	MCI	Brannan, Scott	MCI
Butler, William	MCI	Chilson, Steve	MCI
Purifory, Mel	MCI	Tonti, Peter	MCI
Walker, Fred	MCI	Chahine, Kamal	MITRE
Hsu, Richard	MITRE	Nissley, Mike	MITRE
Belisle, Ken	N.E.T.	Benson, Cathy	N.E.T.
Deal, Jeff	N.E.T.	Rivers, Rich	N.E.T.
Plecity, Mark	NASA	Schertler, Ron	NASA
Collins, Dave	NCS	Boheim, Kenneth	NCS
Lastrina, Mike	NCS	Suraci, Frank	NCS
Gleichsner, William, Lt Col USA	NCS	Dixon, Frank	NCS
Erney, Kenneth	NCS	Kadunce, Dan	NCS
Kerr, James	NCS	Nguyen, Nguyen	NCS
Tang, Wing	NCS	Bhushan, Brij	RCG
Kang, Andrew	RCG	Solanki, Solly	RCG
Balicki, David	SAIC	Brewster, Bill	SAIC

Carestio, Robert	SAIC	Cohen, Peter	SAIC
Elliott, Lee	SAIC	Foster, Dianne	SAIC
Garrity, Jack	SAIC	Hunton, Eden	SAIC
Murray, George	SAIC	Phoenix, Ted	SAIC
Phommachanh, Soy	SAIC	Pinnell, Tom	SAIC
Wheeler, Sharron	SAIC	Thurston, Charlie	SHARES
O'Brian, Dave	Sprint	Laratto, Ken	Sprint
Hollaway, Rex	Tellular Corporation	Bender, Edward	Trans World Comm.
Deutsch, Karen	Trans World Comm.	Gibb, Colin	Veda
Marshall, John	Veda	Poterack, Kristen	Veda
Weiner, Michael	Veda		

APPENDIX B

ATTENDEES

Virginia			
Name	**Company**	**Name**	**Company**
Young, James	Aerospace	Bashant, Major Keith	AFCEA
Childs, MG Leo (Ret) USA	AFCEA	Powell, Capt.	AFCEA
Raupp, Thomas	Ameritech Services	Lewis, Bud	AQC
Yazdahni, Abbas	Artel	Beal, Gwen	AT&T
Beauchamp, Nicholas	AT&T	Couch, Greg	AT&T
Decker, Dave	AT&T	Dunn, Bob	AT&T
Hudson, Beth	AT&T	Schmidt, Fred	AT&T
Scholl, Joseph	AT&T	Stark, Larry	AT&T
Albers, Raymond	Bell Atlantic	Brown, Walt	Bell Atlantic
Cohen, Earl	Bell Atlantic	Forrest, Neal	Bell Atlantic
Godfrey, Nancy	Bell Atlantic	Green, Byron	Bell Atlantic
Langston, Randy	Bell Atlantic	Liptak, Lance	Bell Atlantic
O'Hagah, Kathy	Bell Atlantic	O'Hagen, Kathy	Bell Atlantic
Sellman, Sue	Bell Atlantic	Singer, Ed	Bell Atlantic
Skidmore, Steve	Bell Atlantic	Young, John	Bell Atlantic
Clark John	Bellcore	Kluepfel, Hank	Bellcore
Colin, Ralph	Bellcore	Ripa, Carl V.	Bellcore
Schulz, Randall	Bellcore	Bhagowalia, Sonny	Boeing Computer Services
Hawlingsworth, Bob	Boeing Computer Services	Shepard, S.	GTE
Sherwin, Ron	GTE	Smartt, Richard	GTE
Smartwood, Bob	GTE	Smith, Paul	GTE
Stallworth, Tederyl	GTE	Tredinnick, Richard	GTE
Campbell, Frank	HHS	Foster, Maceo	Hughes Aircraft
Batta, Robert	ITT Corporation	Ganci, Joseph J.	ITT Corporation
Scott, Donald	GTE	Nakamura, Dan	JPL
Baxter, Ray	MCI	Branc, Tom	MCI
Higgins, Roger	MCI	Squire, Harry	MCI
Will, Tom	MCI	Staunton, Fred	MFS
Chahine, Kamal	MITRE	Erskine, George	MITRE
Hsu, Richard	MITRE	Martin, Giles	MITRE

Nissley, Michael	MITRE	Sherman, Rick	MITRE
Lasocki, Richard	Motorola	Clarkston, Tom	N.E.T.
Jakubcak, Doreen	N.E.T.	Bates, Sandra	NASA
DePaula, Ramon	NASA	Sheehan, Mike	NASA
Smith, Michael	NASA	Kutcher, Jack	National Guard Bureau
McCoy, Lois Clark	Natl Inst for Urban Search & Rescue	Villari, Major	National Guard
Bae, Jonathan	NCS	Belford, Bill	NCS
Boheim, Kenneth	NCS-NP	Collins, Dave	NCS
Dimarco, John	NCS	Capone, Lucien	Booz•Allen & Hamilton
Mihalik, Ray	Booz•Allen & Hamilton	Omdahl, Mark	Booz•Allen & Hamilton
Saviru, Carol	Booz•Allen & Hamilton	Steele, Gordon	Booz•Allen & Hamilton
Tassie, Jim	Booz•Allen & Hamilton	Thomas, Joy	Booz•Allen & Hamilton
Amato, Gary	CFSE	Bacon, Steve	CFSE
Erdman, Ben	CFSE	Hanz, Mike	CFSE
Mosley, Vernon	CFSE	Reilly, Dr. James	CFSE
Shepherd, R.	CFSE	Vest, Jim	CFSE
Conner, Chris	CIA	Fitzgibbons, Jane	CIA
Kelly, Jim	CIA	Rogers, Buck	CSC
Trudell, Bernie	CSC	Gunnels, Bill	Defense Logistics Planning
Nelson, Dennis	Department of State	Surprise, Robert	Department of State
Turner, Phil	Department of Justice	Johnson, Robert	Department of Agriculture
Mandrgoc, Mr.	Department of Agriculture	Verga, Pete	Dep to the USDP for Pol Supt
Akins, Maj George	DISA	Barrow, Bruce	DISA
Bittner, James	DISA	Doughty, Edward	DISA
Haislip, COL, USA	DISA	Harvey, LTC Michael	DISA
Hawrylko, Warren P.	DISA	Johnson, John	DISA
Riha, CAPT Mike, USAF	DISA	Sweeney, Col. Bruce	DISA
Williamson, Rush	DISA	Wix, Gail	DISA
Anderson, Bob	DOD	Dolezal, James	DOI
Correia, Nancy	DOT	Bobbit, Mr.	DTS
Foster, Van	DTS	Long, Richard	E-Systems
Miller, Scott	E-Systems	Becker, W.	ESI
Dews, R.	ESI	Mason, R.	ESI
Murphy, Louise	FCC	Schwarzkopf, Joseph	FEMA
Parish, John	FRB	Brilliant, Jerome	GSA

Flynn, George	GSA	Hardesty, Don	GSA
Nichols, Bill	GSA	Pesek, Joe	GSA
Scott, Dave	GSA	Ardmore, Stacey	GTE
Berg, Dennis	GTE	Boswell, R.	GTE
Brienza, Nick	GTE Goverment Systems	Carnahan, Ed	GTE
Colan, Tom	GTE	Demambro, Cindy	GTE
Der Marderosian, Armen	GTE Government Systems	Gicca, Frank	GTE Government Systems
Green, Robert	GTE	Helm, Gerald	GTE
Helm, Harry	GTE	Hinton, Jan	GTE
Jones, William	GTE	Jones, Bobby	GTE Government Systems
Korba, Mike	GTE	Lorgley, Kim	GTE
McCormick, Pat	GTE	Messier, John	GTE Government Systems
Negash, Sand	GTE	Okeson, Lars	GTE
Preher, Janelle	GTE	Elder, Col Stephen	NCS
Fischetti, Mike	DISA	Fogarty, Jim	NCS
Hamilton, Col Paul, USAF	NCS	Karty, Steve	NCS
Lastrina, Mike	NCS	Marquette, Robert	NCS
McKnight, Walt Lt. Col. USAF	NCS	Nguyen, Nguyen	NCS
Perry, C.	NCS	Phillip, Eugene	NCS
Schwedler, Paul	NCS	Smith, Joe	NCS
Springer, Steve	DISA	Suraci, Frank	NCS-NPN
Tang, Wing	NCS	Edwards, Dr. John S.	Northern Telecom Inc.
Randall, Ben	NRC	Maher, Phillip	NSA
Belote, William	NTIA	LaGattuta, Paul	NYNEX
Grago, Scott	Pacific Bell	Arbighter, Jack	Raytheon
Mateeb, Alex	Raytheon	Mateev, Alex	Raytheon
Bhushan, Brij	RCG	Ibach, Rebecca	RCG
Solanki, Solly	RCG	Anderson, Gerald	SAIC
Andrews, Duane	SAIC	Brewster, Bill	SAIC
Cohen, Pete	SAIC	De La Rosa, Kris	SAIC
Herskowitz, Allen	SAIC	Hunton, Eden	SAIC
Pinnell, Tom	SAIC	Luik, John J.	SEMA
Braunberg, Andrew	Signal Magazine	Brohm, Bill	Sprint
Cabanya, Bob	Sprint	Davis, Dave	Sprint
Hackman, Jeff	Sprint	Johnson, Keith	Sprint

Laratto, Ken	Sprint	Matich, Ken	Sprint
O'Brian, David	Sprint	O'Brien, Mark	Sprint
Perry, Jack	Sprint	Roundtree, Helen	Sprint
Sellers, Woody	Sprint	Holloway, Rex	Telular
Sandoz, Rick	Telular	Knauf, A. E.	The Titan Corporation
Vercollone, Joe	The Titan Corporation	Bender, Ed	Transworld
Bouldry, J. F.	U.S. Marine Corps HQ	Bradley, W. S.	U.S. Marine Corps HQ
Roberts, Bruce	Unisys	Ford, Gary, Lt Col USAF	NCS
Jacobson, Harold	USAF	Ashley, Marty	AT&T
Bowser, Vic	NCS	Deal, Jeff	N.E.T.
Dharamsi, Dr.	DISA	Griesner, Mike	
Jerdy, Mr.		Raish, L.	
Sobecke, Jim	Booz•Allen & Hamilton		

APPENDIX C

CALL SCRIPTS

(Immediately following video footage of simulated earthquake)

Bill Deshler: FEMA [Federal Emergency Management Agency] Emergency Support Team [EST], Bill Deshler speaking.

Andrew Hunt: Yes, this is Andrew Hunt, State Emergency Management Agency out here in Missouri. I've been trying to get through for about 24-hours. Every time I get dial tone, I end up with that "all trunks are busy" line. We need some help out here really bad.

Bill Deshler: I know it's bad, but the situation is the same throughout your area. I am glad you got through. What are your immediate needs?

Andrew Hunt: We need food and water for two dozen people for three or four days and probably need some first aid kits out here.

Bill Deshler: OK. Give me your name again, please.

Andrew Hunt: Andrew Hunt.

Bill Deshler: Andrew Hunt. And what is your location?

Andrew Hunt: I am in Pacific, Missouri about 25 - 30 miles west of St. Louis.

Bill Deshler: OK. And what was the telephone number you reached us from?

Andrew Hunt: 314-263-8694.

Bill Deshler: OK. You stick by that phone.

Andrew Hunt: I will.

Bill Deshler: And I'll get FEMA and other state coordinators in your area and let them know where you are...

Andrew Hunt: I'll be looking for them.

Bill Deshler: ...and how to get in touch with you. I will also check to see what relief we have coming in your direction. Just be assured that things are getting better, resources are being mobilized and I'll get back to you within the hour.

Andrew Hunt: Alright. Thank you for your help.

Bill Deshler: Bye, Bye.

Narrator: Shortly after the first call is received, our FEMA representative places a GETS business return call back to the State Official in Missouri.

Andrew Hunt: State Emergency Management Agency.

Bill Deshler: Andrew Hunt? This is Bill Deshler at the FEMA EST. How are you holding up?

Andrew Hunt: It's a nightmare out here. Things aren't looking too good.

Bill Deshler: Things will look better. I just got word that a task force with some necessary supplies is heading your way.

Andrew Hunt: Good.

Bill Deshler: Depending on conditions, they should be there in a few hours.

Andrew Hunt: Alright. We'll be looking for them.

Bill Deshler: Well, I hope they satisfy your near term needs. Let me give you a contact, locally. Our FEMA Coordinator in your area is a fellow by the name of Vic Sparrow.

Andrew Hunt: OK.

Bill Deshler: He can be reached at 314-263-8709.

Andrew Hunt: 8709 Got it.

Bill Deshler: Now, you say you've been having trouble with phone calls all day.

Andrew Hunt: Quite a bit of trouble.

Bill Deshler: Now, I want you to use GETS. That's the Government Emergency Telecommunication Service.

Andrew Hunt: Alright. What do I do?

Bill Deshler: Well, you need a PIN. That's a personal identification number. I'll give you mine.

Andrew Hunt: OK.

Bill Deshler: That's 911309872773.

Andrew Hunt: OK. Got it.

Bill Deshler: OK. Now to use the GETS, you dial 1-710-NCS-GETS (627-4387). Got all that?

Andrew Hunt: Yes.

Bill Deshler: At the tone enter your PIN, that's the one I just gave you.

Andrew Hunt: Alright.

Bill Deshler: When prompted by the operator, you might hear another tone, dial your destination number. That's all ten digits including the area code of the number you want to reach.

Andrew Hunt: Alright. Sounds pretty straightforward.

Bill Deshler: It's quite easy. If you have any difficulty, there is a number you can call that is the GETS user assistance number and that's a 1-800 number.

Andrew Hunt: Good.

Bill Deshler: That's 1-800-818-4387. That also spells GETS.

Andrew Hunt: OK.

Bill Deshler: I'll tell you what. I'll work to get you some additional PINs for the other reps you have in the field. See if you can find a working FAX out there. Get back to me with the number as soon as possible.

Andrew Hunt: I'll do that, sir. Thank you for your help.

Bill Deshler: Keep a stiff upper!

Andrew Hunt: We will.

Bill Deshler: Help is coming and I'll be in touch.

Andrew Hunt: Alright.

Bill Deshler: Bye.

Andrew Hunt: Bye.

Narrator: The management supply unit in Missouri places a cellular GETS call requesting additional support from the National Disaster Medical System (NDMS). Cellular service provides an alternate means to access long distance networks when local wireline networks are damaged or congested. For example, in the aftermath of Hurricane Andrew, cellular proved to be invaluable, extending support to cover those wireline services that had been interrupted.

Tony Mitchell: NDMS, Tony Mitchell speaking.

Gary Roberts: Yes, Tony Mitchell, this is Gary Roberts. I'm a member of the management supply unit of NDMS in Missouri.

Tony Mitchell: Yes, Gary, how can I help you.

Gary Roberts: We'd like to get some support out here for our DMAT [Disaster Medical Assistance Team].

Tony Mitchell: We've got a set of normal medical supplies that we typically ship out in emergency situations like this. It includes anesthesia, antibiotics, splints, bandages, things for trauma injuries and surgical supplies. The main question I have for you is: Do you have any special needs for any special supplies? Do you know of any hazardous materials stored in the area?

Gary Roberts: Yes, Tony, there is, but I don't know what kind they are.

Tony Mitchell: OK. Where are you physically located right now?

Gary Roberts: I'm located in Pacific, Missouri.

Tony Mitchell: I'll tell you what. We've got a place where we typically make a drop in emergency situations: The Spirit of St. Louis Airport. We can usually get it out there in two hours or less. Just let me know if you need anything else. We will just load the standard supplies for now and I'll do anything I can to help.

Gary Roberts: I appreciate it very much. We'll be talking to you later.

Tony Mitchell: OK. Bye, Bye.

Gary Roberts: Bye, Bye.

Narrator: NDMS now receives a wireline mobile subscriber equipment call through GETS from the National Guard medical team in Missouri. Telephone facilities in this disaster area for the moment have been damaged beyond repair. The MSE equipment with the PSN interface extends the PSN into the disaster area restoring local phone service for emergency use only. This call demonstrates interoperability between GETS and Mobile Subscriber Equipment. Note that in this case the operator assists in accessing GETS.

The tropo configuration has extended service for over one hundred miles from Jefferson Barracks, which is near St. Louis, to Jefferson City, MO, which is mid-state.

Tony Mitchell: NDMS, Tony Mitchell speaking.

Sergeant Smith: This is Sergeant Smith of the 735th Medical Support Battalion of the Missouri National Guard.

Tony Mitchell: Yes, Sergeant?

Sergeant Smith: We need more medical supplies and personnel, it's worse out here than we thought.

Tony Mitchell: I'll tell you what. I just spoke with a Gary Roberts from the management supply unit no more than 15 minutes ago and he indicated that he has some medical needs. We are shipping some supplies and expect it out there in about two hours or so. It's being sent to Spirit of St. Louis airport. Do you have any specials needs that otherwise would not be in our typical shipment?

Sergeant Smith: Just more supplies and personnel, that's all we really need right now.

Tony Mitchell: I've already arranged for more supplies, and we'll try to coordinate some more manpower for you.

Sergeant Smith: Thank you, sir.

Tony Mitchell: Alright, you take care.

Narrator: Before medical supplies can be delivered, transportation infrastructure repair must be undertaken.

Our FEMA rep makes a call to the Corps of Engineers through the MSE operator in Missouri. In past disasters the Corps has been an integral point of contact in road, bridge and levy repairs.

Jefferson Barracks: Jefferson Barracks operator 7. How may I direct your call?

Bill Deshler: Yes, operator, this is the FEMA emergency support team in Washington. Could you connect me with the Army Corps of Engineers rep there?

Jefferson Barracks: Certainly, sir.

Bill Deshler: Thanks.

Jefferson Barracks: Connection being made.

Corps of Engineers: Corps of Engineers.

Bill Deshler: Hi, this is Bill Deshler, the FEMA EST rep here in Washington. I am just checking if your initial shipment of equipment got there.

Corps of Engineers: We're in good shape right now. We've got a good balance of bridges and equipment, but we haven't spoken to DOT [Department of Transportation] yet.

Bill Deshler: Well, we have been talking to DOT here in the Washington area. They seem to be pretty well organized. They're beginning to send equipment into your area and I have seen them lay out some plans for temporary roads. Are you ready to build?

Corps of Engineers: We're going to need more gear and a lot more fuel to keep us going, but as soon as DOT tells us where to build a road, we'll build it.

Bill Deshler: Good; you just keep up the work on your end and be careful out there, will you?

Corps of Engineers: OK. Thank you.

Bill Deshler: Bye, Bye.

Corps of Engineers: Bye.

Narrator: This next call demonstrates the Defense Switched Network's [DSN] interoperability with GETS. This prototype capability in a disaster response will interface with PSN and GETS based enhancements. A National Guard hazardous material specialist in Missouri will originate a GETS call from a DSN phone to our EPA [Environmental Protection Agency] HAZMAT [Hazardous Materials] specialist.

Dianne Foster: EPA, Dianne Foster speaking.

Missouri National Guard: Hello, this is the Missouri National Guard. We may have some potential chemical leaks due to the higher ground water in this area. We need some assistance from the EPA on what's being stored here. The location is East St. Louis.

Dianne Foster: We have a database of the types of chemicals stored in that area as well as chemical data profiles identifying which ones pose a hazard. Let me pull up the database and get back to you after I have had a chance to look through it. What is your commercial phone number?

Missouri National Guard: Our commercial number is area code 314-263-8694.

Dianne Foster: 314-263-8694.

Missouri National Guard: And we could use any help that you could give us.

Dianne Foster: OK. No problem. I'll get back to you in a little while.

Missouri National Guard: OK.

Dianne Foster: Bye for now.

Missouri National Guard: Bye.

Narrator: As you can see, the DSN interface worked great to get a call out of the congested area.

A Federal Department of Transportation [DOT] rep now makes a GETS call through a PBX (Private Branch Exchange) to the regional DOT rep located in Jefferson Barracks, Missouri. Often military and commercial locations use PBX systems to access local telephone service. This demonstrates GETS calls can be placed through a PBX.

Teresa Smagacz: T. Smagacz, DOT rep in St. Louis, Missouri. Who am I speaking to?

Judith Hoyt: My name is Judith Hoyt and I am with DOT from Washington, DC.

Teresa Smagacz: Thank goodness you called. You just can't believe the devastation in Missouri. It's absolutely horrible. I'm working right now on a preliminary list of affected routes.

Judith Hoyt: OK.

Teresa Smagacz: I'm doing that as we speak. I'm working with several gentlemen here. I will be able to call you back and report the conditions of these highways within an hour. Is that all right with you?

Judith Hoyt: That's great. That's exactly what we need.

Teresa Smagacz: Great. Thank you so very much, Judith.

Judith Hoyt: Sure. Do you need my FAX number?

Teresa Smagacz: Yes, please.

Judith Hoyt: It's 703 902-3854.

Teresa Smagacz: Great. I'll fax that to you within an hour or less.

Judith Hoyt: OK. Thanks a lot.

Teresa Smagacz: OK.

Judith Hoyt: Bye, Bye.

Narrator: A regional DOT rep uses GETS to return the phone call from an FTS2000 line. For FTS users, GETS provides an alternative route to enhance the probability of call completion.

Judith Hoyt: Hello, Judith Hoyt speaking, DOT.

Teresa Smagacz: Judith?

Judith Hoyt: Yes.

Teresa Smagacz: This is Teresa, regional DOT rep in Missouri.

Judith Hoyt: Hello, Teresa.

Teresa Smagacz: I got the list within an hour. This is fantastic. I have a list of the main routes in the region with their status.

Judith Hoyt: OK.

Teresa Smagacz: Basically there are three major interstates that enter into the St. Louis area. Those are 70, 44 , and 55. Each access the major beltway around St. Louis which is 270/255. Most of the overpasses are destroyed and I'll have to fax this list to you.

Judith Hoyt: You have my fax number, right?

Teresa Smagacz: Yes, I'll fax this out as soon as possible.

Judith Hoyt: Thank you.

Teresa Smagacz: Bye.

Judith Hoyt: Bye.

Narrator: Our Department of State official places a GETS international call to the diplomatic mission in Geneva, Switzerland.

Richard Aber: Good afternoon, US Mission.

Ken Erney: Mr. Aber, this is Ken Erney at the Department of State. I just contacted the disaster field office, and they are very anxious to take advantage of the canine search teams offered.

Richard Aber: The Swiss have notified us that they can be prepared to depart Geneva in 24 hours.

Ken Erney: Rich, the sooner they can get here, the sooner they can get to work. If you will let me know exactly when they plan to arrive and who the contact is, I'll coordinate RASC. By the way, the IEC networks are extremely congested; use GETS if you plan to get through.

Richard Aber: The coverage here has been pretty dramatic. My heart goes out to those folks who lost everything. Anyway, I'll be getting back to you shortly.

Ken Erney: Right, I'll be ready for your call Rich, bye.

Richard Aber: Bye.

Narrator: Meanwhile our FEMA representative contacts the GETS Administration Center at OMNCS to request PIN activation.

Mike Lastrina: GETS Administration Center, Mike Lastrina.

Bill Deshler: Mike, this is Bill Deshler at the FEMA EST.

Mike Lastrina: Yeah, Bill, what can I do for you?

Bill Deshler: I'm wearing my FEMA POC hat today. I'm going to need some new PINs. My stockpile has run out.

Mike Lastrina: OK. We can do that for you. Let me get your password.

Bill Deshler: OK. My password is Aunt Mary.

Mike Lastrina: Aunt Mary. How many are you going to need?

Bill Deshler: I'm going to need 20 PINs.

Mike Lastrina: What type of calling privileges would you like?

Bill Deshler: Nothing at all. We don't need international. What we need -- we need them as soon as possible. Can we get them from the NMOC and faxed to me as soon as possible?

Mike Lastrina: OK. We can do that right away.

Bill Deshler: My fax number is 703 902-3354.

Mike Lastrina: OK. We'll get right on it....

Bill Deshler: By the way, I'm working at the FEMA Emergency Support Team area and if you need to get in touch with me my number is 703 818-9615.

Mike Lastrina: OK, Bill.

Bill Deshler: Thanks very much, Mike.

Mike Lastrina: Bye, Bye.

Narrator: Behind the scenes, the GETS Administration Center places a call to the GTE NMOC to request the additional PINs. The GTE NMOC now places a call to the MCI GETS control center.

Sue Oldham: MCI. This is Sue.

Ernest Henry: This is Ernest Henry from GTE NMOC. Sue, I am sending through E-Mail twenty PINs needing immediate activation. The nature of this urgency lies within the recent Missouri earthquake. Please confirm the activation of these PINs as soon as possible.

Sue Oldham: Ernie, I fully understand the urgency of this activation and I will confirm with you as soon as possible.

Ernest Henry: Thank you, Sue.

Sue Oldham: You're welcome.

Ernest Henry: Goodbye.

Narrator: The NMOC, in addition to calling MCI, will notify AT&T and Sprint of the same information.

The diplomatic mission in Geneva will now return the State Department's prior call via the DTS (Diplomatic Telecommunication Service) network interface to GETS. In this case, please note the DTS network bypasses the PTT [Post, Telephone and Telegraph] as well as the international gateway, providing an alternate international gateway to GETS.

Ken Erney: Ken Erney.

Rich Aber: Hello, Ken, this is Rich Aber. By the way, the DTS gateway to GETS is working great. The canine teams will be arriving tomorrow morning at 8:00 your time. They will be departing Geneva on a Swiss charter flight number SW627. The Swiss commander is Col Rapport. I gave him your name and told him you would be at planeside to meet and greet.

Ken Erney: Thanks, Rich. I really appreciate your help. Please ask the ambassador to convey to the Swiss that their assistance will not go unnoticed. Thanks again, Rich. Bye now.

Narrator: You can see that GETS operates with the three largest Federal Government Networks: DSN, FTS2000, and DTS. Plans are to continue to interoperate as these networks evolve as DSN goes to the DISN, FTS is replaced by the post FTS2000 network, and DTS keeps pace with international networks.

The state official in Missouri now makes a GETS follow-up call back to our FEMA rep to let him know how things have been going.

Bill Deshler: FEMA Emergency Support Team, Bill Deshler.

Andrew Hunt: Yeah, this is Andrew, State Emergency Management Agency again. I'm just calling to let you know we are doing a lot better out here. We got your food and medical supplies.

Bill Deshler: Glad to hear that, Andrew.

Andrew Hunt: Communications have also been much easier after you gave us the GETS PINs.

Bill Deshler: Good. Have you heard from Vic Sparrow?

Andrew Hunt: Yeah, I've talked to him a couple of times already.

Bill Deshler: Good. I've been working on those additional PINs for your field personnel. How many do you need?

Andrew Hunt: Five or six will probably do it.

Bill Deshler: OK, I'll get you six PINs as soon as possible. Did you get that fax number for me?

Andrew Hunt: Yes I did. 314-263-9364.

Bill Deshler: 9364. OK. In addition to those PINs, I'll get you a set of instructions that you can pass out to the new people.

Andrew Hunt: All right, that's a good idea.

Bill Deshler: Give me a call back when you get them and confirm receipt.

Andrew Hunt: I'll do that.

Bill Deshler: Hang in there, fellow.

Andrew Hunt: Thank you.

Narrator: The MCI Control Center makes a GETS control call to the GTE NMOC. Each carrier operates a control center which is staffed 24 hours a day seven days a week. All network operations are controlled at this facility, including security issues such as fraud and abuse.

Ernest Henry: GTE NMOC. This is Ernest Henry. How may I help you?

Sue: Ernie, this is Sue at the MCI control center. Fraud is suspected on 2 PINs as thresholds have been tripped. With PIN number one, calls are being made from multiple locations and attempted to go international. With PIN number two, calls were made multiple locations, using the same PIN number. I will E-mail to you all the details and will be awaiting your guidance.

Ernest Henry: Sue, we will be expecting your E-Mail in the next few minutes with all the details and I will call you back with guidance from the GETS Administration Center.

Sue: Thank you, Ernie.

Ernest Henry: Certainly.

Sue: Bye.

Ernest Henry: Bye.

Narrator: Behind the scenes the GTE NMOC calls the GETS Administration Center to notify them of the suspected fraud. The GETS Administration Center then calls the GETS POC at FEMA. Prompt notification of PIN cancellation and replacement is essential to keeping the field users operational.

Bill Deshler: FEMA, Emergency Support Team. Bill Deshler speaking.

Mike Lastrina: Hi, Bill, this is Mike Lastrina at the GETS Administration Center. How are you doing?

Bill Deshler: Pretty good, I guess. Rescue teams and supplies are moving into the disaster area and the communications have been extremely good thanks to GETS.

Mike Lastrina: OK. We've been noticing a lot of usage and I need for you to put on your GETS Point of Contact hat for me. We have a couple suspected frauds. The first one I want to talk about is on your PIN, 91130987. We're showing simultaneous calls in Missouri and Washington, DC.

Bill Deshler: OK. I don't think that is a problem. I passed my PIN to a State Emergency rep in the disaster area by the name of Andrew Hunt. Usage probably reflect his calls and mine. Looks pretty reasonable to me. Let's leave it active.

Mike Lastrina: Can do. On the second PIN, 1045696541, registered to a FEMA field rep by the name of Vic Sparrow, we show calls originating at several locations including California and Florida, and calls attempted to the Middle East.

Bill Deshler: Sparrow is currently located at the earthquake site. He's been very active, but he certainly hasn't been calling the Middle East. Sounds like the PIN has been compromised. I'll get in touch with him and provide him with a new PIN from the stockpile you provided. Why don't you go ahead and deactivate that one.

Mike Lastrina: Sounds good. Thanks for you quick response. The PIN 105696541 is being deactivated.

Bill Deshler: All right, and I'll get back to you and tell you how we've assigned all these stockpile PINs for you. Have a good day now.

Mike Lastrina: Thank you, bye.

Narrator: Now, of course, Mr. Sparrow has been cut off, so it is essential for the FEMA rep to advise him of his new PIN number.

Vic Sparrow: FEMA field rep, Vic Sparrow.

Bill Deshler: Hey Vic, this is Bill Deshler, your GETS POC here at FEMA.

Vic Sparrow: Hey, Bill. What can I do for you?

Bill Deshler: Well, we just received information that your PIN may have been compromised. There've been lots of out of area calls, even some to the Middle East.

Vic Sparrow: Really?

Bill Deshler: So we've deactivated your PIN.

Vic Sparrow: Hey, now wait a minute, Bill.

Bill Deshler: Relax, Vic. We have a new PIN here for you right now so standby to write this down.

Vic Sparrow: Oh, well, that sounds better.

Bill Deshler: 546965411662. You can continue to use your current password, we'll just change the PIN to your name.

Vic Sparrow: OK. Bill, I've been making several cellular calls trying to get things arranged, and that's probably what caused the compromise.

Bill Deshler: That makes sense, but you probably had some shoulder-surfers too. Disasters bring out looters of all kinds.

Vic Sparrow: Well, thanks for taking care of the problem and keeping me active with the new PIN. You know I need that GETS capability.

Bill Deshler: I understand, and I'm glad we could help.

Vic Sparrow: Thanks a lot, Bill.

Bill Deshler: Good luck.

Vic Sparrow: Bye.

Bill Deshler: Bye.

Narrator: For the final call in this scenario, the Missouri State officials makes another GETS call back to our FEMA rep. Unlike his first attempt, immediately after the disaster, the state official has been able to get through faster using GETS.

Bill Deshler: FEMA Emergency Support Team, Bill Deshler.

Andrew Hunt: Yes, this is Andrew, State Emergency Management Agency again.

Bill Deshler: How are things going?

Andrew Hunt: Things are going much better. We just got your fax in with the PIN numbers and managed to use one to call you back, so I guess they work.

Bill Deshler: Thanks for closing the loop up here.

Andrew Hunt: No problem, thank you for the use of your PIN and sending out the new ones.

Bill Deshler: You guys are doing the tough part. Keep it up out there.

Andrew Hunt: Thank you, sir.

Bill Deshler: Bye.

Andrew Hunt: Bye.

APPENDIX D

LIST OF ACRONYMS

ACTS	Advanced Communications Technology Satellite
AIN	Advanced Intelligent Network
AMT	ACTS Mobile Terminal
ANSI	American National Standards Institute
ATM	Asynchronous Transfer Mode
CST	Central Standard Time
DACS	Digital Access and Cross-Connect System
DMAT	Disaster Medical Assistance Team
DOT	Department of Transportation
DoD	Department of Defense
DSN	Defense Switched Network
DTMF	Dual-Tone Multi-Frequency
DTS	Diplomatic Telecommunications Service
EO	End Office
EPA	Environmental Protection Agency
EROS	Earth Resources Observation Systems
EST	Emergency Support Team
FECC	Federal Emergency Communications Coordinator
FEMA	Federal Emergency Management Agency
FTS2000	Federal Telecommunications System 2000
GETS	Government Emergency Telecommunications Service
HAZMAT	Hazardous Materials
HF	High Frequency
HPC	High Probability of Completion
IC	Integration Contractor
IDNX	Integrated Digital Network Exchange
IEC	Interexchange Carrier
ISDN	Integrated Services Digital Network

JPL	Jet Propulsion Laboratory
LATA	Local Access and Transport Area
LC	Limited Capability
LEC	Local Exchange Carrier
MSA	Metropolitan Service Area
MSE	Mobile Subscriber Equipment
MTSO	Mobile Telephone Switching Office
NCC	National Coordinating Center
NCS	National Communications System
NDMS	National Disaster Medical System
NLP	National Level NS/EP Telecommunications Program
NMOC	Network Management Operations Center
NPA	Numbering Plan Area
NRAD	Naval Command, Control and Ocean Surveillance Center's Research and Development Division
NS/EP	National Security and Emergency Preparedness
NSTAC	National Security Telecommunications Advisory Committee
OA&M	Operations, Administration and Maintenance
OMNCS	Office of the Manager, NCS
PBX	Private Branch Exchange
PIN	Personal Identification Number
POC	Point of Contact
POTS	Plain Old Telephone Service
PSN	Public Switched Network
PTT	Post, Telephone and Telegraph
SHARES	Shared HF Resources
SS7	Signaling System 7
STI	SHARES Telephone Interface
UBC	Uniform Building Code
USGS	United States Geological Survey
VSAT	Very Small Aperture Terminal